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CLINICAL ASSISTANT IN THE ORTHOPÆDIC SERVICE AND LATE RESIDENT SURGICAL OFFICER, MANCHESTER ROYAL INFIRMARY

IN 1925, in the Salford Royal Hospital, Jefferson performed the first successful embolectomy in Great Britain and, in a paper giving a survey of the subject, introduced the operation into this country. Sampson Handley (1907) and Moynihan (1907) had each tried vainly to remove clot from peripheral arteries, but their attempts had been forgotten and their suggestions unadopted. Between 1907 and 1925 the Scandinavian surgeons had begun to operate with increasing confidence in cases of arterial embolism, but their enthusiastic reports of repeated successes appear to have passed unnoticed by the great majority of British surgeons.

In 1934, in a further paper, Jefferson reported six personal cases. Banks (1932), Larks (1934), Riddell (1935), Stevenson and Walker (1938), and several others have also published isolated successes in this country. Jefferson's second and fuller paper urged that the operation of embolectomy was an established surgical procedure, capable of producing very good results in the peripheral arteries. Successful removal of an aortic embolus had not, however, been performed in Britain up to that date, and carotid embolism had never been diagnosed during life. The present paper, based on eight further cases, describes the first successful British aortic embolectomy and also reports the first diagnosed case of carotid embolism. It also attempts to clarify the present position of operations for embolic occlusion of arteries.

The main clinical facts of the eight cases are summarised in Table I. Of these, seven occurred in the Manchester Royal Infirmary in the last 3 years and one in Mr. Jefferson's private practice.

EMBOLISM OF THE ABDOMINAL AORTA

CASE 1.—The patient was a man of 25. While cleaning his teeth on the morning of May 10th, 1935, both his hands suddenly became painful, numb, and useless, and five minutes later he had similar pain and numbness in his left leg. These symptoms only lasted about twenty minutes, and then completely disappeared from the leg and from the right arm. At 10.15 A.M. on the same day he was suddenly struck with severe pain, complete paralysis, and intense coldness in both legs from the groins to the toes. The pain gradually localised itself to the feet and the calves, but the coldness and the paralysis remain unchanged.

At 3 P.M., when he was admitted to the Infirmary, both his legs were white and cold up to the groins and buttocks. They were completely anæsthetic and pulseless, and the only movement present was feeble hip flexion. His right hand and arm were normal, but his left radial pulse was absent. Full movement was present, and both hands were painless and obviously recovering. The heart was fibrillating and there were physical signs of aortic and mitral stenosis.

The diagnosis of aortic embolism was made, but because, immediately before operation, pulsation was felt in the right external iliac artery, the left side remaining pulseless, it was assumed that the aortic embolus had broken and that part of it had become lodged in the right common femoral artery (Fig. 1).

Operation (G. J., R. B.) was begun, under local anæsthesia, at 4 P.M. The right common femoral artery was exposed by a vertical incision, and normal pulsation was found in its upper part. In the lower half, however, there was a large clot, easily visible and palpable through the vessel wall and completely occluding the artery. Slings of rubber tubing were placed above and below this clot and held taut, and an incision 1 cm. long was made into the artery over the thrombus. The clot immediately presented and, with a little gentle milking, some 4 in. of thrombus was shot out of the incision. This was followed by a sharp spurt of arterial bleeding, which was controlled by tightening the slings. The artery was then closed and the slings left loose. The circulation of the leg immediately improved.

TABLE I—SUMMARY OF EIGHT CASES OF ARTERIAL EMBOLISM IN ORDER OF DISCUSSION

Case	Date	Sex and age	Source of embolus	Occluded artery	Length of history (hours)	Operation	Result	Notes
1	May 10, 1935	M. 25	Rheumatic carditis; auricular fibrillation	Abdominal aorta	5½	Embolectomy. (Retrograde femoro-iliac)	Complete success	Also had embolisms in both arms with spontaneous recovery
2	Mar. 22, 1937	F. 61	Ditto	Ditto	46	Exploration. (Clot irremovable)	Death 19 hrs. after operation	—
3	Mar. 9, 1935	M. 67	Thyrotoxicosis; auricular fibrillation	Ditto	8	Exploration. (Secondary clot removed)	Death 6 hrs. after operation	Extraordinary length of secondary clot removed
4	Jan. 23, 1937	M. 37	Ditto	Left common femoral	17½	Embolectomy	Success	Developed ischæmic contracture of calf muscles
5	Nov. 17, 1936	F. 49	Rheumatic carditis; auricular fibrillation	Ditto	6½	None	Spontaneous recovery	Recovering when first seen
6	Sept. 23, 1937	F. 49	Cardiac muscle failure (undetermined cause)	Ditto	53	None	Gangrene and death in 3 weeks	Uninfluenced by conservative measures (papaverine, &c.)
7	Dec. 14, 1937	F. 62	Thyrotoxicosis; cardiac muscle failure	Ditto	50	None	Gangrene and death in 14 days	Uninfluenced by conservative measures
8	Feb. 21, 1938	F. 54	Rheumatic carditis; auricular fibrillation	(*a*) Right brachial (*b*) Left common carotid	9 Immediate	Embolectomy None	Complete success in arm Died	Developed carotid embolism 18 days later —

A second incision was now made at right angles to the line of the left common femoral artery. This vessel was found to be empty and absolutely pulseless. Two lengths of rubber tubing were placed around it under tension and the wound temporarily covered. A left Abernethy incision was then made and the iliac arteries exposed. The external iliac artery was full of clot, and this clot extended right up into the bifurcation of the aorta, above which level normal pulsation could be felt.

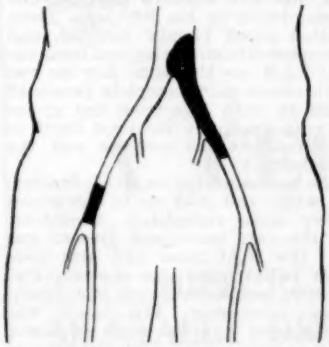

FIG. 1.—Position of clots in Case 1.

The assistant now maintained traction on the rubber tube guarding the right femoral artery in order to arrest any dislodged clot which might escape in that direction. The left common femoral artery was opened for a length of 1 cm., and a large clot was massaged down from the aortic bifurcation through the left iliac arteries. The clot was violently expelled through the incision by a forcible arterial spurt. The incision in the left common femoral artery was then closed, normal pulsation was seen along the whole line of the vessel, and once more the circulation of the limb improved immediately.

The limbs recovered full movement a few hours after operation, but it took 24 hours for them to recover full sensation, and it was five days before pain completely disappeared. There was never any return of pulsation which could be felt in either dorsalis pedis or posterior tibial artery. The patient's heart was sufficiently recovered for Dr. Crighton Bramwell, who undertook the care of his cardiac condition, to allow him to walk on June 28th, and on July 7th he left hospital. He remained in reasonable health until early August, when his cardiac trouble again became severe. He died of cardiac failure on August 12th, and autopsy showed that the aorta had remained patent and that there had been no trouble at either femoral suture line.

CASE 2 would never have been operated upon at all but for the fact that her paralysis had not come on until 36 hours after the onset of her pain. This led us to hope that the embolus had remained a "riding" one for a long time, and that complete occlusion had only been very recent. However, the clot was completely fixed and irremovable, and it is probable that operation 46 hours after the onset of the first symptom will never do any good. The post-mortem specimen is shown in Fig. 2.

CASE 3 deserves comment because of the extraordinary lengths of secondary clot which were removed—11¼ in. on the right side and 39¼ in. on the left. The clot on the left side, removed through the common femoral artery (Fig. 3), was as long as the distance from 2 in. above the groin to the patient's big toe, and its terminal branches were so fine that they must have come from the arteries of the foot. The primary embolus could not, however, be removed, largely because of atheromatous changes in the aorta.

Mason and Warren (1931) collected 116 cases of aortic embolism from the literature, and reported one of their own. The literature had been previously analysed by Welch (1909), Hesse (1921), Key (1922), and Banowitch and Ira (1928). Since Mason and Warren's paper cases have been reported by Pla and Cuoco (1935), Doane (1936), Hindmarsh and Sandberg (1936), Kulenkampff (1936), and de Gracia et al. (1936). With the three cases reported here the total now stands at 125. Of these cases twenty-eight have been operated upon, one twice, with nine successes in twenty-nine operations. These successes are analysed in Table II.

Aortic embolism is less rare than these figures would suggest. It has been reported at all ages. The source of the embolus is almost always cardiac.

The *symptoms* are usually quite obvious. As in two of our cases, the onset of the pain tends to be gradual, and the paraplegia, though always sudden, may follow after some interval. This suggests that for some appreciable period the embolus may be "riding" at the aortic bifurcation and producing only incomplete obstruction. This state of affairs was actually found in Kulenkampff's case (1936). In our second case the pain began in one iliac fossa. Riddell (1937) suggests that this site of onset may be due to aortic colic. Usually, however, the pain starts suddenly in both legs.

The *diagnosis* should present no difficulty. Thrombosis of the inferior vena cava can apparently simulate aortic embolism (Fontaine, Israel, and Pereira 1936), but where a patient complains of acute pain in both legs with absent pulses on both sides the condition should not be misdiagnosed. Sudden paraplegia makes the diagnosis even more certain, yet our first case was sent in "for lumbar sympathectomy" and our second was not diagnosed at all until too late.

The *prognosis* without operation is virtually hopeless. Welch (1909) stated that three cases (reported by Gull, Chvostek, and Nunez) had survived without operation. Neuhof (1932) claims to have seen spontaneous cure once. All the remaining reported cases have

FIG. 2

FIG. 3

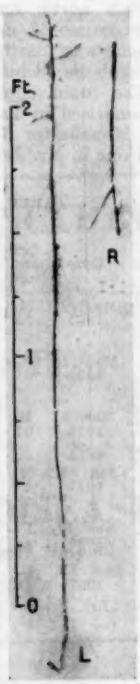

FIG. 2.—Post-mortem specimen in Case 2.

FIG. 3.—Photograph of the clots removed from the right and left femoral arteries in Case 3, compared with a scale of feet.

TABLE II—SUCCESSFUL OPERATIONS FOR AORTIC EMBOLISM

—	Reporter	Duration (hrs.)	Sex and age	Source of embolus	Operative approach used	Subsequent history
1	Bauer (1913)	3	M. 39	Cardiac	Transperitoneal	Death in 2½ years
2	Key (1922)	23	M. 44	Cardiac	Retrograde	Unknown
3	Usadel (1931)	½	F. 44	Cardiac	Retroperitoneal	Unknown
4	Dravermann (1931)	6	? 41	Cardiac	Transperitoneal	Alive in 12 months
5	Westerborn (1932)	Im.	M. 56	Cardiac	Retrograde	Recurrence in 9 months
6	Westerborn (1932)	6	Same patient as No. 5		Retrograde	Unknown
7	Danzis (*a*) (1933)	2	M. 68	Cardiac (post-op.)	Retrograde	Death in 3 weeks
8	Hindmarsh and Sandberg (1936)	22	Details not stated		Retrograde	Unknown
9	Griffiths (*b*) (1938)	5½	M. 25	Cardiac	Retrograde	Death in 3 months

Note.—(*a*) Case 7 was operated upon by Commando.
(*b*) Case 9 was operated upon by Jefferson.
Im. = immediate.

died, save only two (Hesse 1921) who survived double amputations. The most important factor in prognosis is the time-interval before operation. Of the nine reported successes, seven were operated upon within 6 hours.

The *operative approach* should in all cases be retrograde but not endovascular, the clot being milked down from the aorta and extracted from the femoral arteries. The transperitoneal and retroperitoneal approaches are too severe for these patients, and appear to be much more difficult. Del Campo, using the transperitoneal approach on Pla and Cuoco's (1935) case, never found the embolus, and Lundblad (1924) testifies to the difficulties caused by gas-filled bowel. The number of successes speaks for itself. Of the nine survivors, six were operated upon by the retrograde approach.

EMBOLISM OF THE COMMON FEMORAL ARTERY

The present series included four cases of common femoral embolism. One of these will be fully described, as it is noteworthy for two reasons—the time-interval before successful operation and the post-operative development of an ischæmic contracture.

CASE 4.—This patient was operated upon by Jefferson and myself on Jan. 23rd, 1937, 17½ hours after his first symptom. His embolus had been dislodged from a fibrillating auricle in a thyrotoxic heart, his symptoms had been typical, and his left leg was apparently on the point of gangrene when we saw him. It is interesting to note that, though his symptoms were entirely localised to below the knee, the oscillometer failed to detect any pulsations below the apex of Scarpa's triangle, and thus indicated accurately the level of the occlusion.

The operation followed the routine previously described by Jefferson (1934). An inch of clot was milked out intact from the situation illustrated in Fig. 4, and brisk hæmorrhage followed. As soon as the wound in the artery was closed the patient was able to move his ankle, but toe movements did not return at all for 3 hours. Moreover, it took 13 hours for this limb to become as warm as its fellow, and the pain did not completely subside for 3 days.

It was noted 48 hours after operation that the ankle and foot were extremely plantar-flexed, with the toes cocked up on the metatarsal heads and flexed at the interphalangeal joints. There was no anæsthesia except for a little dulling over the inner side of the great toe, and no sign of a nerve palsy. The claw-foot, however, was severe and typical. It could be only partly corrected by passive stretching, and this was accompanied by severe pain in the calf. The calf muscles were hard and indurated, and there was a large bleb in the skin overlying their bellies. This was an ischæmic contracture of the posterior calf muscles, which became so severe that the foot had ultimately to be wrenched up to neutral position and put into a plaster cast.

The patient was able to walk in plaster on March 28th. His subsequent progress has been most satisfactory. The plaster was discarded after a month, and since the end of April, 1937, he has walked well without splint or appliance. Subtotal thyroidectomy was performed by Prof. John Morley on Sept. 17th, with further improvement. The fibrillation, however, remained uncured until January, 1938, when Dr. Reginald Ellis obtained a rapid and uneventful return to normal rhythm with quinidine. Now (November, 1938) the patient is in normal health and is walking well. The contracture of the calf is almost completely resolved. The dorsalis pedis pulse has been palpable since the fourth day after embolectomy, but the posterior tibial pulse has not yet returned. There is no doubt that although the main blood stream has been restored, the blood-supply to the calf muscles was defective, either as a result of thrombosis or of the previous lodgment of a small clot in the posterior tibial artery.

This was a gratifying case. Successful embolectomy after 17 hours is very rare, and this patient's progress is a striking testimony to the value of the operation.

The next three cases can be disposed of briefly. None was operated upon, one because there were already definite signs of recovery 6¾ hours after embolism. This patient (Case 5) was a woman of 49 whose symptoms again were those of a left common femoral embolism. When we saw her, her pain had almost disappeared, there was full active movement in all the joints of the limb, and the colour had been restored almost to normal. We watched this case most carefully, being prepared to operate at any moment, but she improved steadily and ultimately made a complete spontaneous recovery.

The other two patients (Cases 6 and 7) were less fortunate. They are important because, since spontaneous recovery has often been reported, there are those who believe that any successful embolectomy has really only been an unimportant episode in a natural tendency towards recovery. Both these patients were active housewives. Both were admitted to the Infirmary with common femoral embolisms of over 48 hours' history. Both proceeded to gangrene, and neither lived long enough for amputation to be performed. The most deplorable feature of both these cases is the fact that they had each sought the advice of their private practitioners within eight hours of the onset of symptoms.

EMBOLISM OF THE RIGHT BRACHIAL AND LEFT COMMON CAROTID ARTERIES

The last case in our series is of singular importance. It confirms a belief that has been strongly held in this hospital, that embolism of the great carotid vessels must happen, and that they are not exempt from blockage by clots that have been proved to assail every other of the main arterial trunks.

CASE 8.—A woman of 54 was admitted to the Infirmary on Feb. 21st, 1938. She had suffered from mitral stenosis and auricular fibrillation for years, and she had kept to her bed since Feb. 13th because of a cold. At 3 P.M. on Feb. 21st she got out of bed and,

while she was washing, her right hand suddenly became paralysed, numb, and dead white. She had no pain at all. We saw her at 10.30 P.M. when, although the hand and forearm were intensely pale and quite pulseless below the axilla, the arm was absolutely painless, sensation was normal, and there was full and powerful movement in all the joints. Despite these latter findings the complete absence of pulse (and of oscillations) indicated an acute arterial occlusion, and in the presence of auricular fibrillation, embolism seemed the only answer to the problem. However, we waited an hour before operating (a delay which we shall not allow again) and there was no improvement in that time.

FIG. 4.—Position of clot in Case 4.

FIG. 5.—Position of clot in Case 8.

Operation (D. Ll. G., J. F. H.) was performed in the usual manner under local anæsthesia. A soft clot, 8 cm. long, was found in the lower end of the brachial artery, already extending into the upper ends of the radial and ulnar vessels (Fig. 5). It was extracted through a small incision in the lower end of the brachial artery, and the circulation was immediately and completely restored. The local post-operative progress was satisfactory, the radial pulse and normal colour of the limb being restored, but her general condition remained poor. The fibrillation was treated with digitalis, and on March 11th, 18 days after operation, normal rhythm was restored with a rate of 80. The same day she was transferred to a medical ward for further treatment for her heart.

While she was actually in the lift on the way to the medical ward she collapsed. The nurse who was with her noticed that her face suddenly reddened and that her eyes appeared dreamy. Within the next few moments she was deeply unconscious. I saw her within ten minutes of this collapse. She was breathing stertorously, the heart was fibrillating at the rate of 160 to the minute, and she was quite unconscious. The left arm and leg moved occasionally, but the right side lay quite still. No pulses were palpable in either arm or leg nor in the left carotid, but the right carotid pulse was good. No improvement in the general peripheral circulation could be obtained by the usual drugs.

Although the picture was complicated by the acute circulatory collapse, we made a confident diagnosis of left carotid embolism on the presence of a right hemiplegia of sudden origin with absence of the left carotid pulse. Operation was considered impossible because of the severity of the general collapse, but she rather surprisingly lived for 12 hours after the catastrophe—sufficiently long to make us regret not having explored the artery. If however it is true that nerve tissue can only survive 7–10 minutes without blood-supply it seems unlikely that embolectomy will ever be a great success in carotid embolism.

Post-mortem examination confirmed the diagnosis. The left common carotid artery (Fig. 6) contained a hard clot occluding the bifurcation and extending into both main branches. A recent ante-mortem thrombus was present as well, but the clot was quite mobile and could easily have been extracted at operation. The right brachial artery was patent and showed very little evidence of the previous operation.

This is an important case. In addition to showing a right brachial embolism which was completely painless, it is, so far as I can determine, the first diagnosed case of common carotid embolism. The extensive reviews of Key (1922), Danzis (1933), Pearse (1933), and Strömbeck (1935), and the less extensive papers of other writers contain no reference whatever to carotid embolism.

"Embolic hemiplegia" has been a common diagnosis for many years, but it has always been thought to be due to embolism of the middle cerebral artery. Embolism of the common carotid, a larger and more central vessel, has not even been considered. Post-mortem examinations of these cases, at least in my experience, seldom include a dissection of the carotids, and it is rather striking that the pathologist does not very often find the clot which everyone expects to be in the middle cerebral.

CLINICAL FEATURES OF ARTERIAL EMBOLISM

The pain and paralysis which embolism induces in the sufferer causes him almost invariably to call for medical advice without delay. The onus of diagnosis lies on the general practitioner and the fate of the limb depends on him. Diagnosis is usually absurdly easy. Only one of these nine cases was at all obscure, and that only because it was painless. Such complete absence of pain is very unusual, but the lightning onset commonly described is by no means constant (Allen and McKechnie 1936, Murray 1936). Jefferson (1934 and Lewis (1936) have shown that the rapidity of onset of the pain depends upon the rate at which the circulatory block becomes complete and upon the amount of work which the limb is doing at the time. Thus, rapidity or slowness of onset should not influence the diagnosis. Any case showing acute or subacute pain with pallor, paralysis, and *absence of distal pulses* must be regarded as an embolism.

FIG. 6.—Post-mortem specimen of the carotid embolus in Case 8.

In the diagnosis of the site of embolism we found oscillometric tests very useful. An aneroid sphygmomanometer can be used as an adequate oscillometer to distinguish between popliteal and femoral embolism, a distinction which we have found otherwise difficult.

The most recent aid to diagnosis is X ray arteriography with Thorotrast. Leriche, Fontaine, and Frieh (1933) urged the use of this method in the diagnosis and localisation of all arterial obstructions.

Gosset, Bertrand, and Patel (1933) and Contiades and Naulleau (1934) described its use in the localisation of emboli but, despite its undoubted accuracy, the obvious dangers of this method give it no advantage over oscillometry.

TREATMENT

Recent papers show no unanimity about the treatment of peripheral embolism. Embolectomy is not universally favoured. On one side are those who advocate more radical operations, while at the other extreme there have even been a few recent papers advocating conservative treatment.

This difference of opinion appears to have arisen as a result of a somewhat uncritical dissatisfaction with embolectomy, especially noticeable in the American literature (Graham 1937, de Takats 1936, and others). Certain writers complain that there are too many failures and too many post-operative deaths. These criticisms are admittedly true. Strömbeck (1935) reviewed 327 operations; 63 per cent. of the patients died in hospital, and only 12 per cent. survived for five years. Danzis (1933) reported that only 41 per cent. of embolectomies were successful, and that a quarter of these successful cases died in hospital. Mason and Hurxthal (1928), Allen (1929), and other reporters of small series tell similar stories.

Such figures are certainly formidable, but it is quite illogical to regard them as an argument against embolectomy. It is never the operation which kills these patients, but the disease which makes the operation necessary. A type of operation which is confined almost entirely to the victims of severe heart disease will always carry a high death-rate, even if the operation itself be a very mild procedure, and the limb embolectomies are at least that. The gangrene which results from a delay in diagnosis is a much more potent cause of death, and it is difficult to imagine how any alternative treatment will lower this death-rate. Other things being equal, the number of successes and failures after embolectomy depends first and foremost upon the time between the onset of symptoms and the operation. Before 6 hours have elapsed there is a very good chance of success. After 12 hours there is hardly any.

Success after 12 hours has been reported in 18 per cent. of cases by Danzis (1933), against 60 per cent. after less than 4 hours. In the femoral artery Holst (1922) obtained an isolated success after 27 hours' and Lundberg (1924) after 19½ hours' delay. Otherwise our 17-hour success (Case 4) appears to be the longest of the authenticated cases on record, and it is certainly the only success reported in this country after so long an interval. However, this point should not be stressed, for it might perhaps encourage delay.

Apart from the time factor, the other causes of failure have been analysed by Neuhof (1932). Extensive arterial disease or thrombosis at the suture line because of bad technique may cause failure, though the chief cause of post-operative thrombosis is intimal damage due to undue delay. If only we saw all these cases within 6 hours there would be fewer failures and a lower death-rate. Embolectomy cannot and never will save the neglected late case; nor will any other treatment.

ALTERNATIVES TO EMBOLECTOMY

The renewed interest in conservative treatment is particularly unfortunate. The simple method of hopefully awaiting spontaneous cure is advocated by some even after correct diagnosis (see paper by Jeanneney and Darget 1937). Spontaneous cure certainly can occur. We saw it in the arms of our first case and in the leg of our fifth, but the only way in which it can happen is by the lucky movement of the clot into a side branch (Girdlestone 1935, Schmorell 1933). To await such good fortune as a declared course of action (or inaction) is to invite disaster. Bad as are the figures for cure by embolectomy, the figures for conservatism are worse. Danzis (1933) found that 87 per cent. of cases not operated upon were dead within a fortnight, and all the remainder were amputated. Murray (1936) saw thirteen non-operated cases, of which only eight lived long enough to develop gangrene before they died.

Even if an embolus could be made to move from a critical position, there is no way of guaranteeing that it will move into a safe one. Indeed it is much more likely to move to a worse site, for example to the popliteal from the femoral artery. For this reason I view antispasmodic and vasodilator drugs without hope. Papaverine, an opium alkaloid introduced into the treatment of embolism by Denk (1934), has had no effect whatever on two of our admittedly hopeless cases; it did nothing at all to limit gangrene. Herrmann and Reid (1933) and de Takats (1936) look hopefully upon the alternate suction and pressure of a passive vascular exercise machine (the Pavaex), but the results of the machine, as of the drug, do not justify enthusiasm. Both might well be used after operation, but certainly not before.

Embolectomy with ligature (Finch 1934) lessens the risk of a spreading post-operative thrombosis from the suture line, but this procedure appears less radical and less sound than the latest introduction, actual excision of the portion of artery containing the clot. This operation, *arterectomy*, may hold out more chance of survival for the infarcted limb whose operative treatment has been delayed. It certainly abolishes the possibility of thrombosis at the suture line and does away with any difficulty in the actual extraction of the primary clot. Arterectomy was introduced by Leriche, who has performed it for chronic arterial occlusions since 1917. Its experimental basis is reviewed in a recent paper by Leriche, Fontaine, and Dupertuis (1937), and they claim that excision of a length of the artery opens up the collateral circulation by abolishing reflex spasm above and below the site of the obstruction. Leriche himself has only performed it six times for embolism, but his views are extensively discussed in several papers by his pupils. One of these, Pampari (1936), advises arterectomy if the endothelium under the embolus appears damaged, if the operation is performed 24 or more hours after the embolism, or if gangrene continues to threaten despite embolectomy. These suggestions appear logical and wise.

As a primary treatment for embolism arterectomy has had its failures (Ferey 1935, Mathieu et al. 1935, Soupault 1935), while Schein (1935), who performed it for a 3½-hour brachial case, obtained complete recovery much more slowly than he should have done after embolectomy. In my hands the operation has twice been strikingly successful in the treatment of traumatic arterial occlusion threatening gangrene, but I cannot regard it as the ideal operation for embolism. After all, recovery after arterectomy depends entirely upon collateral circulation, whereas embolectomy leaves the main vessel intact. "A good arterectomy is better than a bad embolectomy" (Fontaine), but a good embolectomy is best of all.

Tardy recovery of the pulse after successful embolectomy is not uncommon, especially after operation has been delayed (Riddell 1935), and, even

where pulsation is seen at operation below the level of the embolus, there is no certainty of immediate recovery of the pulse (Deitch 1936). Our series of cases confirms both these statements.

The extremely interesting development of ischæmic contracture after successful embolectomy was first recorded by Jefferson (1934) and was discussed by me in a paper read to the British Orthopædic Association in May, 1938.

My thanks are due to Mr. Geoffrey Jefferson, who has suggested and criticised this paper and assisted it in every possible way. I am also grateful to the various members of the staff of the Manchester Royal Infirmary for their assistance and for permission to report such cases as were not under Mr. Jefferson's care. The surgeons operating on these cases were Mr. Geoffrey Jefferson, Mr. Roland Barnes, Mr. J. F. Heslop, and myself.

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MEDICAL PRACTITIONERS AND STUDENTS IN SOVIET RUSSIA.—A statement issued by the "Russia Today" Press Service says that at the beginning of 1938 there were in the U.S.S.R. 106,000 practising doctors, as against 19,785 in Russia in 1914. The number of medical students was at that time 91,000, and during the educational year 1938–39 some 25,000 were admitted to the schools. The number of men and women graduating in medicine during 1938 is given as 12,500.

CEREBRAL PARATUBERCULOSIS

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OUR object is to draw attention to a disturbance of the central nervous system sometimes observed in children and young persons suffering from pulmonary tuberculosis. It seems to be due to an acute exudative reaction localised in the cerebral meninges. Though associated with tuberculosis and apparently a reaction (specific or allergic) to the tuberculous virus, its fleeting character and benignity clearly distinguish it from tuberculous meningitis. Nor does it appear to be identical with the acute aseptic meningitis of Wallgren (1925).

We have in the last two years seen 5 examples of the syndrome, and it seems to deserve recognition as a complication of pulmonary tuberculosis. It is evidently uncommon and, so far as we are aware, has not yet been described as a clinical entity. We hope that a brief account of our cases may lead others to record experience that will add to our knowledge of the disease and lead to an explanation of its pathology. Before describing the individual cases an attempt may be made to produce a composite picture though this must of necessity be sketchy.

The patients have all been young, their ages ranging from 6 to 20 years. Four were suffering from pulmonary tuberculosis of adult type and one from generalised tuberculosis following primary infection. In each instance the pulmonary disease has been mainly exudative and the symptoms of comparatively recent origin. The leading symptoms were headache and lethargy or drowsiness. These preceded or accompanied the onset of fever. Physical signs were few apart from sluggish reactions of the pupils and sluggish or absent knee-jerks during the attack. In three instances a rash was observed—erythema nodosum, a generalised simple erythema, and a mixed papular and morbilliform eruption. The symptoms of cerebral irritation commonly seen in aseptic meningitis have been absent except in the case of the small child whose case differed in many respects from the other four. Lumbar puncture yielded cerebro-spinal fluid (C.S.F.) which was under pressure but was clear and sterile and showed no cellular or chemical abnormality. Its withdrawal was followed by a notable relief of the headache. Recovery was uneventful and took from 7 to 14 days. One patient (No. 1) had a second attack after a quiescent interval of several months but this was again followed by a spontaneous recovery.

THE CASES

CASE 1.—Originally examined as a "contact," this girl, aged 12, was admitted to the Black Notley Sanatorium in April, 1936, for minimal apical tuberculosis with pleural effusion on the right side. She improved till October, 1936, when after a period of irregular sub-febrile temperature and lassitude the temperature rose abruptly to 104·6° F. and she complained of nausea and left temporal headache and became very drowsy. No abnormal physical signs could be detected apart from those due to pleurisy. The throat was clean, the tympanic membranes normal, and there were no signs of meningeal irritation. Her blood failed to agglutinate *Bacillus typhosus*, *B. paratyphosus*, or *Brucella abortus*. The

C.S.F. was under pressure but clear. The protein, albumin, and sugar estimations were normal and culture was sterile. No tubercle bacilli were found and no excess of cells was noted. The headache was relieved by lumbar puncture and her temperature fell by slow lysis in 16 days. A skiagram of the chest showed no significant change during the relapse. After 4 months of normal progress her temperature again rose in the course of 24 hours to 104·2° F. She had a slight rigor, was very drowsy, had a "stuffy" headache, and blurring of vision. Her pupils reacted sluggishly to light and the right disc showed a suggestion of œdema but no other abnormal physical signs were found. The C.S.F. was again under pressure but otherwise normal. Her symptoms rapidly disappeared but her temperature did not reach normal for 22 days. Since then she has remained well.

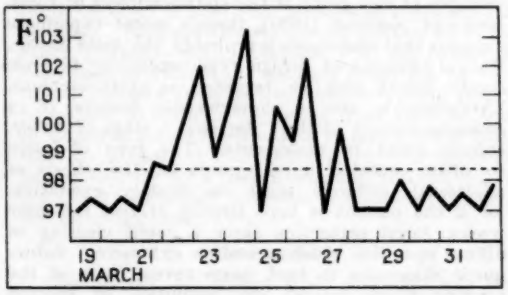
CASE 2.—This girl of 18 had an artificial pneumothorax for disease of the lower lobe of the right lung in April, 1936. Satisfactory collapse was obtained and tubercle bacilli disappeared from the sputum within a month. An air replacement for a large pleural effusion on the right side was performed in September, 1936. In May, 1937, her temperature rose abruptly to 100° F. and she complained of headache and malaise. A generalised eruption, papular but morbilliform in some places, suddenly appeared 48 hours later. This cleared rapidly and her temperature subsided in 3 days. Nine days later, however, she complained of headache which was severe and persistent. She was drowsy, the temperature rose to 99° F., but there were no abnormal physical signs. The throat and tympanic membranes were normal and the Widal reaction was negative. The C.S.F. was clear and under pressure but normal in chemical and cellular content and sterile. Her headache was much relieved by the lumbar puncture and after 8 days of intermittent slight headache she recovered.

CASE 3.—A girl aged 19 was admitted to sanatorium in September, 1935, with bilateral tuberculosis of acute exudative type. Artificial pneumothorax was induced on the right side in November, 1935, almost as a forlorn hope. The result exceeded expectations and a satisfactory collapse was obtained. The disease in the left lung resolved and she improved till February, 1937, when she complained of headache. Her temperature rose to 99·4° F. and she was very drowsy and mentally sluggish. A generalised erythema developed, scarlatiniform in appearance, but fleeting and lasting only 4 hours. The temperature was normal in 24 hours and the headache and drowsiness passed off in 6 days. Unfortunately lumbar puncture was not performed in this case, but in view of the similarity to the other cases we took it to be an example of the same condition.

CASE 4.—Early in December, 1936, this girl, aged 6, developed a cough and on Jan. 10th, 1937, she had convulsions which were followed by 6 days of drowsiness and delirium. She was admitted to Oldchurch Hospital, Romford, on Jan. 16th with a temperature of 101·4° F. The pulse-rate was 120 and respirations 24. There was complete flaccid paralysis of the left limbs, the abdominal reflexes were absent, and there was slight rigidity of the neck muscles. Kernig's sign was not elicited. Her mental condition was irritable and there was papilloedema of the right disc. Crepitations were heard over both lungs and a skiagram showed soft stippling all over the lungs and diffuse clouding of the hilar shadows. The X ray picture was that seen in miliary tuberculosis of the relatively benign type. The C.S.F. was under increased pressure, but the glucose content was normal. The chlorides were 795 mg. per 100 c.cm. and no cells, tubercle bacilli, or other organisms were found. During the next month her condition slowly improved but the paralysis of the left limbs, now spastic in type, persisted. The signs in her chest disappeared and radiography on Feb. 15th showed a normal picture with complete clearing of the stippling seen a month earlier. There have been no further developments in the chest. The Mantoux test was negative in the acute stage of the illness but became positive (1 in 100 dilution) 4 days after an eruption on the legs of erythema nodosum on Feb. 18th. She slowly recovered from the hemiplegia and in September, 1937, when transferred to Black Notley Sanatorium, she was apparently in normal health. She has remained well since that time.

There is little doubt that the dramatic appearance of symptoms of cerebral compression in this case was due to an œdematous intracerebral reaction, associated with a tuberculoma of the brain. We have included the case in our series because the symptoms and clinical findings suggest a relationship with the other cases, though in this instance a focal lesion in the brain might be assumed.

CASE 5.—This girl, who was aged 17, had had an artificial pneumothorax at Oldchurch Hospital on August 31st, 1936, for exudative disease of the left lung. She was transferred to Black Notley Sanatorium on Nov. 27th. Here the presence of adhesions necessitated endoscopy, and on July 2nd, 1937, the



adhesions were partially divided. Despite improved collapse and apparent absence of disease in the other lung, tubercle bacilli were still occasionally found in the sputum till February, 1938, after which consistently negative results were obtained. The sedimentation-rate fell from 22 mm. in December, 1936, to 4 mm. in February, 1938.

On March 20th she complained of headache, mild nausea, and drowsiness. She was at this time afebrile and showed no abnormal physical signs. On March 23rd, however, her temperature rose suddenly to 102° F. with persistence of the headaches. The next day her temperature reached 103° F. and she vomited once and became more drowsy. The tympanic membranes and the fauces were normal and the optic fundi showed no change. The knee-jerks were sluggish but no other abnormal signs were found in the central nervous system. Agglutination tests to *B. typhosus*, *B. paratyphosus* B, and *Br. abortus* were negative. The C.S.F. was under high pressure but sterile, and there was no excess of cells, sugar, or protein, which was 40 mg. per 100 c.cm. The next day (March 25th) the right knee-jerk was very feeble and the left could not be elicited. The headache persisted for the next 3 days and her temperature oscillated between 98° and 102° F., but by March 28th (8 days from onset) she had completely recovered (see Chart).

DISCUSSION

These clinical pictures suggest a mild degree of cerebral compression due to increased tension of the C.S.F. This exudation is followed by a comparatively rapid resolution with disappearance of symptoms. The tendency to exudative phenomena is characteristic of the earlier stages of a tuberculous invasion. Such

exudations may be classed as paratuberculous, epituberculous, or tuberculous.

The paratuberculous exudative reactions which accompany or follow tuberculous infection appear to be due to the infection but are not directly associated with tubercle bacilli. The typical example is erythema nodosum. Tubercle bacilli have never been demonstrated in these skin lesions. They resemble rather the reaction of allergic tissues to tuberculin—e.g., in the Mantoux test—nor is the eruption specific for tuberculous toxin, though tuberculosis is its commonest cause. Wallgren (1930) would place phlyctenular conjunctivitis in the same category. Here again is an exudative condition often seen in scrofulous children though tubercle bacilli have never been found in the phlyctenules. The pleural effusions so common in adolescent and especially in child contacts are often sterile and perhaps these should also be classed as paratuberculous.

Perifocal reactions and epituberculous manifestations may be separated from those just considered because in them tuberculous exudation is closely associated with foci of bacillary infection. A typical example of this group is the epituberculosis of Eliasberg and Neuland (1920), though recent experience suggests that atelectasis is probably the main factor. Pleural effusions of benign type containing tubercle bacilli might also be regarded as epituberculous. Exudation is also a characteristic feature of a common variety of the "tertiary" stage of tuberculosis found in adolescents. The type of lesion so often revealed in skiagrams of the chests of adolescent sufferers must be mainly exudative, for if the patient is kept strictly at rest for some weeks, serial skiagrams show a rapid clearing of diffuse opacities which are often extensive. Subsequent skiagrams in such cases reveal little of the scarring which follows the resolution of caseous areas.

After referring to erythema nodosum, phlyctenules, and acute serous pleuritis as paratuberculous manifestations, Wallgren suggests that the total of tuberculo-toxic phenomena is probably not exhausted by this list. This is no doubt true. Certain forms of chronic or subacute miliary tuberculosis, to judge from their rapid evolution and swift disappearance, may be regarded as paratuberculous or epituberculous in type. We do not know if the diffuse stippling of the lungs sometimes seen in the skiagrams of tuberculous children is due to the shadows of innumerable tubercles which abort almost as soon as they are formed (a supposition which seems improbable) or to an allergic exudation around hæmatogenous deposit of bacilli or to a fleeting alveolar exudation evoked by tuberculous toxins, the product of bacilli operating elsewhere. It is interesting to note that a miliary stippling of this order accompanied by symptoms of cerebral compression preceded the appearance of erythema nodosum in one of our patients (Case 4).

In general the exudative manifestations of tuberculosis are associated with disease of benign type, a fact which accounts for our ignorance of their exact pathology. Our experience suggests that the central nervous system is not immune from exudative disease. In one case a tuberculoma of the brain might be inferred but the clinical picture indicated that an acute outpouring of C.S.F. was mainly responsible for the symptoms, and when this subsided both the local and general signs of cerebral irritation and compression disappeared. The tuberculous focus must therefore have been strictly local and the clinical course indicated an epituberculous condition. It seems probable that cerebral epi- or paratuberculosis was the cause of the syndrome described in the four other reports and that excess of C.S.F. was due either to an allergic response evoked by the deposit of a few tubercles on the cerebral membranes or to a similar reaction to tuberculous toxin produced elsewhere.

Such an interpretation is supported by the observations of an Australian physician (Walker 1935). Approaching the same problem from the pathological standpoint in tuberculous meningitis and its lesions as seen at autopsy, he had been impressed by the peculiar gelatinous exudate found in the meshes of the pia-arachnoid in the intercrural spaces, Sylvian fissure, and around the cerebellum. He believed that the exudative reaction might be partly allergic in nature and analogous to the gelatinous exudation discovered at autopsy in certain cases of pulmonary epituberculosis. In each case there was a tuberculous lesion with an outpouring of exudation of similar composition.

It is interesting to note the early symptoms of tuberculous meningitis in adults as recorded by the same observer who has had exceptional experience of this disease—headache "the one universal symptom" and "a curious dreamy state even suggesting drug addiction or hysteria." The dazed condition of some of our patients with the headache, lassitude, and listlessness might well have indicated the early symptoms of tuberculous meningitis. It is thus possible that isolated tubercles were the cause of the exudative reaction of which the increased subdural pressure was evidence. Recovery from tuberculous meningitis is not unknown. Kramer and Stein (1931) were able to collect 73 cases apparently well authenticated and it may be true that "there are many cases of recovery from tuberculous affections of the central nervous systems where no meningeal symptoms are observed" (Walker 1935). Dr. Roodhouse Gloyne has drawn our attention to a specimen in the museum of the London Chest Hospital which shows a healed cerebellar tuberculoma discovered in the brain of a patient who died from pulmonary tuberculosis but was believed to have recovered from tuberculous meningitis in his youth. There can be little doubt that a cerebral tuberculoma was responsible for the transient hemiplegia which was a striking feature in one of our cases.

The syndrome we have described should not be confused with that known as acute aseptic meningitis or lymphocytic choriomeningitis in which there is usually evidence of meningeal irritation and the C.S.F., though sterile, shows lymphocytic excess. It was the absence of any evident cause or any evidence of epidemiological disease that led Wallgren to consider acute aseptic meningitis as a new malady of the nervous system probably infective but apparently not tuberculous. The only case that we have seen reported which seems to belong to the present group is one recorded by Lafforgue and Andrieu (1936). The symptoms closely resemble those related but inoculation of a guinea-pig with C.S.F. obtained by lumbar puncture gave rise to tuberculosis. Still more interesting is the subsequent history of the patient who seven months later, on the death of the guinea-pig, was re-examined. The patient was found to have developed a left-sided pleural effusion and tuberculous infiltration of the right apex. The association of pleural effusion is noteworthy as also is the sequence of events, for the pulmonary tuberculosis followed the cerebral symptoms instead of, as in our cases, preceding them.

SUMMARY

(1) Five cases of pulmonary tuberculosis developed symptoms of cerebral compression with fever which ran a benign course and resolved spontaneously.

(2) The syndrome is thought to be due to exudation into the meninges of clear, sterile fluid and is considered of allergic rather than specific nature. Its affinity with erythema nodosum is suggested.

(3) The name cerebral paratuberculosis is proposed for the condition.

Our acknowledgments are due to Dr. W. A. Bullough, county medical officer for Essex, and to Dr. M. C. Wilkinson, medical superintendent of Black Notley Sanatorium, for permission to publish the cases and for affording us opportunity to carry out the investigations.

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A CASE OF BERI-BERI OCCURRING IN LONDON

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Chronic beri-beri takes two main forms, the "wet" and the "dry." The wet form is characterised by œdema and cardiac symptoms, whereas in the dry form the main features are those of a peripheral polyneuritis. Although heart failure, œdema, and neuritis may often be seen together, it is usual for one or other set of symptoms to predominate (Keefer 1930).

Well-defined cases of beri-beri are common in South India, China, the East Indies, and Japan. The disease is associated with a diet consisting largely of polished rice. In Louisiana, U.S.A., the chief manifestation of the disease is œdema of the legs; hence the term *maladie des jambes*. This occurs in the late summer and autumn, when the diet is mainly of rice; it clears up in the winter, when much more meat is eaten.

It was the association of beri-beri with polished rice, first observed by Eijkman (1897), that led to the discovery of what is now called vitamin B_1. Although, even in recent years, there have been many theories regarding the causation of beri-beri, there is now no doubt that it is entirely due to deficiency in vitamin B_1. This substance has been isolated in pure crystalline form and has also been synthesised. Injections of the pure substance have been shown to cure beri-beri with dramatic rapidity (Hermano and Eubanas 1935, Platt and Lu 1936, Hawes, Monteiro, and Smith 1937, Hawes 1938, Hashimoto 1937).

Apart from frank beri-beri, there is a considerable accumulation of evidence that certain well-recognised conditions are due to deficiency in vitamin B_1. First, there is the state of "conditioned deficiency," which usually takes the form of a polyneuritis. Here the lack of vitamin is only partially, if at all, due directly to a dietary fault; it is mainly brought about by decreased absorption, increased demand, or loss of appetite. Examples of such "conditioned beri-beri" are found in the polyneuritis of chronic alcoholism, of pregnancy, and of gastro-intestinal lesions, such as cœliac disease, chronic dysentery, and after resection. Secondly, a mild deficiency of vitamin B_1 may cause a series of symptoms and signs. There is good evidence that many cases of marasmus in infants (Cowgill 1932), of gastro-intestinal stasis (Poole et al. 1937), and of slight degrees of cardiac failure (Jones and Sure 1937, Weiss and Wilkins 1936, 1937) are due to vitamin-B_1 deficiency. In fact, it has been shown in tests both on animals and on human beings (especially children) that increase in the intake of vitamin B_1 above that in the normal diet often results in an increased gain in weight, improved appetite, and a decreased incidence of constipation (Harris 1938).

Apart from a few cases of obvious beri-beri which develop in seamen on board ship and thus may reach this country through the ports, the condition of frank beri-beri as met with in the east is unknown in England. Whereas diseases due to deficiencies of the other vitamins—night-blindness and xerophthalmia from lack of vitamin A, pellagra from lack of vitamin B_2, scurvy from lack of vitamin C, and rickets from lack of vitamin D—occur from time to time in England, I have been unable to find a single reference to a case, in this country, of true beri-beri, caused entirely by a diet deficient in vitamin B_1. It is for this reason that I consider it of interest to report the following case.

CASE RECORD

The patient, an Indian male aged 25, was first seen on August 11th, 1938, in the cardiac department of the London Hospital by Dr. C. J. Gavey, who referred him to the medical out-patient department as a possible case of beri-beri. He had come from Calcutta to London ten months previously and was working as an errand boy to a tailor in the east end of London. He complained of increasing swelling of the legs of two months' duration. During the same period he had felt generally unwell and complained of weakness and fatigue, depression, insomnia, and constipation. For one month he had suffered from palpitations and from dyspnœa on exertion. He had also a slight dry cough.

He lived with eleven other young Indian men in a more than usually dilapidated four-roomed house in the slums. Another Indian came in to cook for them twice a day. They all had the same diet, but when I visited the house none except the patient had symptoms at all resembling early beri-beri. The diet consisted mainly of rice, the meals being as follows: 7.30 A.M. breakfast: 1 cup of tea, with milk and sugar, two slices of white bread and butter; 1 P.M. dinner: rice and fish curry; 8 P.M. supper: rice and fish curry; 11 P.M.: tea, one or two slices of bread and butter or cake or an apple. Twice a week the fish was replaced by meat. In Calcutta the patient's diet had been similar, except that he ate more fruit and that, whereas the rice obtainable in this country is highly polished, the rice in Calcutta is only partially polished.

The patient was a well-built young man, weighing 12 st. 8 lb. He was not dyspnœic. There was considerable œdema of both legs below the knees, maximal at the calves. The ankles and feet were only slightly affected. The skin of the calves was tense and shiny. Nothing abnormal was detected in the respiratory system. The pulse was regular and its rate 108. The apex-beat was rather forcible in the fifth space; there was no obvious cardiac enlargement to right

or left on percussion. The sounds were normal, and there was a soft systolic murmur at the apex. The blood pressure was 125/70. Nothing abnormal was detected in the abdomen. Apart from sluggish ankle-jerks, no motor or sensory abnormality was detected. The fundi were normal. Nothing abnormal was found on routine examination of the urine. A report of a cardioscopic examination by Dr. Gavey stated that the heart was full-sized and the diaphragm very high. The electrocardiogram was normal.

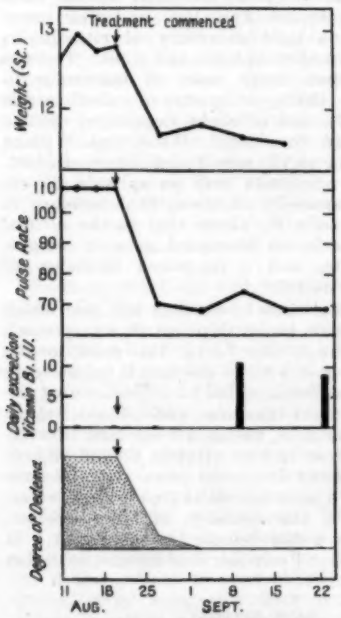

Chart showing progress of patient with beri-beri treated with intramuscular injections of crystalline vitamin B_1 (initial dose 20 mg., followed by 10 mg. weekly).

On the strength of the dietetic history, the œdema of the legs, and the tachycardia a provisional diagnosis of beri-beri was made. The patient could not be persuaded to enter hospital; hence subsequent investigations were somewhat hampered. He was seen in the out-patient department on three further occasions without treatment. On the first of these a specimen of urine was obtained and taken to Cambridge for estimation of vitamin B_1 according to the method of Harris and Leong (1936; cf. also Harris, Leong, and Ungley 1938). On the fourth visit he brought with him a 24-hours' specimen of urine for estimation of vitamin B_1. Neither of these contained any measurable amount of the vitamin. Except for slight variations in weight (see Figure), his condition was unchanged. On this last visit he was given an intramuscular injection of 2 c.cm. of Benerva forte ("1 c.cm. = 10 mg. crystalline vitamin B_1 = 5000 international units approximately"). Thereafter he was seen once a week, and an injection of 1 c.cm. of benerva forte was given each time. On three occasions, after one, three and five weeks, he brought with him a specimen of urine collected during the twenty-four hours before his coming to the hospital—i.e., six days after the previous injection. The first contained no vitamin B_1, the second 11 I.U., and the third 8 I.U. of the vitamin.

When seen a week after his first injection, he reported relief of his constipation and a pronounced diuresis, together with a corresponding diminution of the swelling of his legs. His symptoms of malaise and fatigue were only partially improved. His weight had fallen to 11 st. 10 lb., a loss of a stone. There was a considerable decrease in the œdema, and the pulse-rate was 70. The following week he said that he felt perfectly fit, with a very good appetite and abounding energy. The œdema had completely gone, the pulse-rate was 68, and the force of the apex-beat had diminished; there was no change in any of the other physical signs. From this time onwards there was no further alteration in his condition. The sluggish ankle-jerks and the systolic apical murmur persisted throughout. The blood pressure remained practically unaltered at 120/80. On Sept. 26th—i.e., after six weeks—the electrocardiogram was unchanged and a cardioscopy report by Dr. Gavey said that "the heart appeared somewhat smaller than at the previous examination. The diaphragm was still high, but the heart appeared normal and did not seem to warrant the term 'full size.'" Unfortunately, a teleradiogram of the heart had not been taken before treatment was instituted.

DIAGNOSIS

The diagnosis of this case as one of beri-beri has been made on four criteria: the clinical features, the diet, the therapeutic effect of crystalline vitamin B_1, and the analysis of the urine.

Clinical features.—The symptoms of malaise, anorexia, constipation, œdema, palpitations, and dyspnœa on exertion are in harmony with the diagnosis of "wet" beri-beri. A noteworthy feature of the clinical manifestations in this case, however, is an entire lack of symptoms or signs of neuritis. This is unusual, for, although commonly either the polyneuritis or the œdema with cardiac manifestations predominates (Keefer 1930), as indicated by the division into wet and dry types, "it is rare to observe 'beri-beri heart' without at least minimal signs of polyneuritis" (Strauss 1938).

The œdema of the legs, the tachycardia at rest, and the forcible apex-beat are, again, characteristic features of the disease. There was not, in this case, any effusion of the serous membranes, which is often seen in wet beri-beri. Although a radiogram of the heart was not taken, the heart's size appears to have been increased compared with its normal size as seen after treatment. An increase in the cardiac dimensions, especially of the right side, is typical of beri-beri heart (Wenckebach 1928, 1934). The blood pressure was normal and did not change during treatment, although in other cases an increased or decreased systolic pressure and, in particular, a lowered diastolic pressure has been observed (Keefer 1930, Kepler 1925, Shimazono 1927, Hawes 1938).

Similarly, several investigators have reported changes in the electrocardiogram. Wenckeback (1928) and Hashimoto (1937) both describe a slight right

ESTIMATED VITAMIN-B_1 CONTENT OF PATIENT'S DIET

Food	Estimated intake (grammes)	Calories per 100 g.	B_1 units per 100 g.	Total calories	Total B_1 units
Polished rice	600	350	0	2100	0
White bread	150	270	20	405	30
Butter	20	770	0	154	0
Fish	150	70	40	105	45
Tea, milk, and sugar	—	—	—	100	20
Apple	100	50	40	50	40
	Daily total			2914	135

These values are based on those given by Fixsen and Roscoe (1937–38) and Mottram and Radloff (1937); where several estimates are given by these authors, average values have been quoted.

(O.T.) ventricular preponderance. Alterations in the T waves are often seen (Weiss and Wilkins 1936, Strauss 1938). Thus, many of the cases studied by Keefer (1930) showed an inversion of T_1, and Hashimoto's case showed an inverted T_3. Other changes,

such as a general decrease in voltage or an increase in the Q–T interval, have also been described (Weiss and Wilkins 1936). However, the case here reported showed a physiological curve before treatment, and there was no alteration after treatment. Normal electrocardiograms were also found in the cases studied by Scott and Herrmann (1928).

Diet.—Although it was not possible to determine the exact details of the diet in regard to quantity, a fairly good estimate of the amounts of the various foodstuffs can be made and hence an estimate of the approximate vitamin-B_1 content. The Table shows such a calculation, in which a daily energy value of about 3000 calories is assumed.

On this basis the daily intake of vitamin B_1 is about 135 I.U. (There is very little difference when meat is eaten instead of fish.) Now, the "physiological minimum" of vitamin B_1 is about 300 I.U. (Baker and Wright 1936a, b, Baker, Wright, and Drummond 1937, Cowgill 1932, Fraser 1937, Stepp, Kühnau, and Schroeder 1937). This diet is thus definitely deficient in the vitamin. On the other hand, the partly polished rice eaten in Calcutta contains about 40 I.U. per 100 g. (Ahmad 1938). Moreover, fish is very much cheaper there; hence normally more of this is consumed in India than is represented in the diet detailed in the Table. It can be safely assumed, therefore, that in India the patient was consuming something like 200 units more of vitamin B_1 daily. This would raise the level of the total intake of vitamin B_1 to about 335 I.U., a value above that of the minimal requirement.

Therapeutic effect of pure vitamin B_1.—The patient received no other treatment than weekly injections of large doses of crystalline vitamin B_1. Within the first week there was a diuresis accompanied by a loss of one stone in weight and a considerable diminution of the œdema; the heart-rate fell to within normal limits, and the constipation and anorexia disappeared. Such a rapid response to injection of the crystalline vitamin is characteristic of beri-beri (Strauss 1938). It is seen best in the almost miraculously rapid relief of the cardiac failure in the acute fulminating type of the disease, the so-called *shoshin* of Japan (Hawes, Monteiro, and Smith 1937, Hawes 1938). Here the general clinical condition improves almost at once, the blood pressure returns to normal within two hours, and diuresis begins in about twenty-four hours. In the case of chronic beri-beri in a Japanese boy of 17, reported by Hashimoto (1937), the tachycardia disappeared and the electrocardiogram returned to normal within three days; at the end of a week the œdema and cardiac enlargement had also gone and the patient was completely well.

As stated, the patient received one injection of 20 mg. (or 10,000 I.U.) of vitamin B_1, which completely relieved the tachycardia and most of the œdema, and subsequently weekly injections of 10 mg. (or 5000 I.U.). These quantities are higher than those used by most previous authors. Hermano and Eubanas (1935) used a single dose of 1 mg.; Hashimoto (1937) injected 1 mg. daily. Hawes, Monteiro, and Smith (1937), treating the acute form of beri-beri, gave doses of 1000–3000 I.U. intramuscularly or, in the very severe cases, intravenously, with dramatic results, and the effect of one injection lasted for weeks. On the other hand, Vorhaus, Williams, and Waterman (1935) used 10 mg. a day in their treatment of 100 patients with various types of neuritis; they claim that 44 were completely relieved, 48 improved, and only 8 remained unimproved.

Analysis of urine.—Harris and Leong (1936) and Harris, Leong, and Ungley (1938) have shown that an adult on the average normal diet excretes not less than 10–20 I.U. daily. Lower values were found for general surgical (average 8 I.U.) or medical (average 5 I.U.) cases in hospital. In conditioned deficiency diseases, excluding polyneuritis, the average excretion was 2·8 I.U. and in nutritional polyneuritis 1·6 I.U. Patients with beri-beri undergoing treatment gave values similar to the last. The patient whose case is here reported showed no measurable amount of the vitamin before treatment; a week after the first injection of 10,000 units there was still no excretion of B_1; after three weeks (total vitamin B_1 injected: 20,000 units) 11 units was excreted, and after five weeks (total vitamin B_1 injected: 30,000 units) the amount excreted was still only 8 units. This recalls the observation of Harris, Leong, and Ungley, that after repeated dosage cases of nutritional polyneuritis still showed low excretion values of between 2 and 10 units.

SIMILAR CASES

As already stated, I have been unable to find a reference to a case of true beri-beri occurring in England. Garrett (1938) describes a case of polyneuritis with œdema simulating beri-beri.

The patient was a girl of a "good middle class family, having a normal mixed diet unlikely to cause a vitamin B deficiency." There were œdema, tachycardia, and weakness of the legs, with absent knee- and ankle-jerks and a doubtful extensor plantar response. She was treated with daily injections of vitamin B_1. At first 4 mg. daily were injected, then 2 mg. daily. After 11 days there was no change in the pulse-rate and only a slight increase in the output of urine. The dose of vitamin B_1 was then raised to 10 mg. daily, and this was followed in three days by a decrease in the tachycardia from 150 to 108 and an improvement in the subjective condition of the legs. The œdema only slowly cleared up during the next month.

Garrett calls attention to "the delay in the reduction in the pulse-rate and the delay in the diuresis" and concludes: "It is for this reason that I doubt if the present case can be considered to be due to a vitamin deficiency."

Apart from endemic beri-beri in the Far East and elsewhere, certain recorded cases are worthy of note in relation to the present case. Reference has already been made to the condition described as *maladie des jambes* in Louisiana and due to a rice diet (Scott and Herrmann 1928). Kepler (1925) reports an interesting case of a coloured woman who lived for three years on a diet consisting mainly of raw starch. She then began to have neuritic symptoms and œdema of the legs. The œdema became worse, and there were marked dyspnœa, drowsiness, and vomiting. Treatment with autolysed yeast caused a rapid improvement in the symptoms and signs, with a disappearance of the œdema and tachycardia and a return to normal in the size of the heart.

Recently several workers have drawn attention to the similarity of certain cardiac conditions, many of them vague, to the condition of "beri-beri heart." Abt (1935) suggests that many cases of congenital cardiac hypertrophy in children may be due to deficiency of vitamin B_1. Jones and Sure (1937) claim that most of the symptoms in a group of 30 cardiac cases (hypertensive, myocardial, and arteriosclerotic) are improved on a diet with a high content of vitamin B_1. Weiss and Wilkins (1936, 1937) report that such symptoms as dyspnœa, tachycardia,

palpitations, and exhaustion are often associated with a history of inadequate diet and with other signs of vitamin deficiency, such as glossitis, polyneuritis, and pellagroid dermatitis. They report remarkable improvement in such cases on increasing the vitamin B_1 in the diet. Abt, and Weiss and Wilkins, state that, histologically, the heart in these conditions resembles the beri-beri heart as described in the classical work of Wenckebach (1928, 1934). Such clinical and pathological observations suggest the existence of a condition which one might term "pre-beri-beri." It would be of interest to study the excretion of vitamin B_1 in such cases.

SUMMARY

(1) A case is reported of an Indian, resident in the east end of London, with œdema of the legs and tachycardia. The diagnosis of "wet" beri-beri was made on the following criteria: (*a*) the clinical features; (*b*) the diet, which consisted mainly of polished rice and was calculated to contain an amount of vitamin B_1 decidedly below the recognised minimal requirements; (*c*) the result of treatment, injection of pure crystalline vitamin B_1, causing the complete and rapid disappearance of the symptoms; and (*d*) the analysis of the urine, no measurable amount of vitamin B_1 being excreted before treatment.

(2) Study of the excretion of vitamin B_1 is important in determining the ætiology of obscure cases of œdema and of polyneuritis. Mild cases of this nature, due to deficiency of the vitamin—a condition which may be called "pre-beri-beri"—are probably not uncommon.

I have to thank Dr. R. R. Bomford for permission to publish this case and for many useful suggestions. My thanks are also due to L. J. Harris, Sc.D., for much helpful criticism, for the urinary analyses, and especially for allowing me access to the proofs of his book on "Vitamins and Vitamin Deficiencies."

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VASCULAR REACTIONS TO THE CONTRAST BATH IN HEALTH AND IN RHEUMATOID ARTHRITIS

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THE local contrast bath, whereby a part of the body is immersed alternately in hot and cold water, is commonly recommended for the relief of rheumatism, and is undoubtedly valuable. Krusen (1937) writes of these baths: "their application has been chiefly on an empirical basis; nevertheless, the apparently excellent results have warranted their continuance." We shall present here certain experimental data which help to explain the physiological effects of the contrast bath and indicate the best technique for its use. Our experiments also, by unmasking differences in vascular reactions between normal and arthritic subjects, throw light on the vascular disorder so often coexistent with rheumatoid arthritis.

EXPERIMENTAL CONTRAST BATH

The principle of our investigations was to observe alterations in the blood-flow by recording changes of the surface temperature at various points during the exposure of a part alternately to heat and cold. The surface temperature was measured with an electrical skin-thermometer, the thermo-couples being affixed to the following points:—

Lead 1.—On skin of dorsal aspect of terminal phalanx of the thumb of the immersed arm. ————————

Lead 2.—On skin of palmar aspect of terminal phalanx of the thumb of the immersed arm. .——.——.

Lead 3.—On skin of palmar aspect of terminal phalanx of the thumb of the exposed arm. - - - - - - - - - - -

(The same numbers and methods of representation are used on all the charts.)

An enclosed arm-bath was constructed into which one or both forearms and hands could be placed in either hot or cold water. The water in one container was heated by an electric immersion heater and the water in the other was cooled by ice. By raising or lowering the containers and by manipulating the two-way tap, the bath could be filled or emptied from either container. The thumbs protruded through slots in the roof of the bath, for better readings of the temperature could be obtained if the thermo-couples were dry. It was realised that the excursions of skin temperature of the exposed thumb would not be as great as those of the skin in contact with the hot or cold water, but none the less we believe that the readings adequately reflect the changes in temperature and circulation of the immersed limb.

The temperature of the hot water in the bath usually ranged between 42° C. and 45° C. (107° F. and 113° F.) and of the cold water between 8·5° C. and 12·5° C. (47° F. and 55° F.). The time of application of

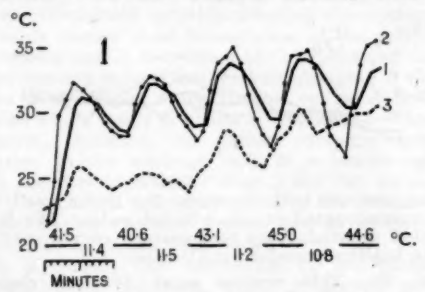
the hot and cold water varied. Satisfactory results were obtained with 5 minutes hot and 5 minutes cold, 6 hot and 4 cold, and 7 hot and 3 cold. Shorter periods were tried with some success where vascular function was normal, but even in the most responsive normal subject the 1 minute hot and 1 minute cold, customarily recommended, was too short to produce a satisfactory reaction. It may be emphasised here that the effect sought in the local contrast bath is the active exercise of the peripheral vessels and not the effect upon the heart-rate or general metabolism which may be sought in giving general contrast baths or the Scotch douche.

To determine the variations in blood-flow brought about in remote extremities by the autonomic or central control mechanism, only one arm was immersed. The other arm lay exposed on the level of the bath at room temperature. Those undergoing the test wore normal indoor clothing and room temperature was maintained around 18·5° C. (65° F.).

THE PERIPHERAL VASCULAR RESPONSE

Fig. 1 is a surface temperature chart from a healthy man aged 33. Leads 1 and 2 show a rapid warming of the arm immersed in hot water for 5 minutes. Immersion now in cold water for 5 minutes causes a fall of the local skin temperature but not to the original resting temperature. Throughout the 45 minutes' test (5 hot and 4 cold periods of 5 minutes each) there is a net rise of temperature indicating an increase of blood-flow in the immersed part and a more gradual rise of the surface temperature of the opposite, exposed arm (Lead 3). Lead 2 rises and falls before Lead 1, showing that the palmar tip of the thumb responds to the environmental temperature more rapidly than the dorsal area. We have always noticed this to be the case in a normal man, and it may be attributed to the great number of arteriolar-venous anastomoses in the palmar surfaces which short-circuit the capillary bed, and thus rapidly augment or curtail the blood-flow (Lewis 1936).

It is reasonable to consider that Lead 1 gives an indication of the local cutaneous capillary blood-flow



and Lead 2 the local blood-flow through the anastomotic channels of the skin of the immersed limb. Lead 3 shows the temperature changes effected in a remote limb through the central or autonomic control mechanism. Lead 3 corresponds to Lead 2 and overlies the anastomotic channels. This is the area which soonest reflects changes in the remote peripheral circulation.

Fig. 1 typifies the best form of temperature curves which result from application of hot and cold water to one arm under the conditions described. The main features are :—

(1) Rapid adaptability of the local circulation to changing environment—cooling and warming of the limbs produces a swinging or remittent form of curve in Leads 1 and 2.

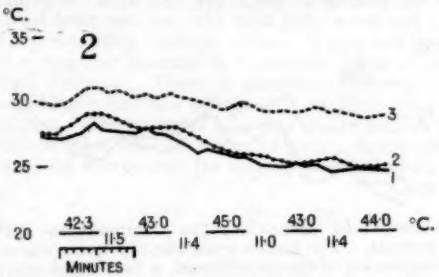
(2) A net increase in warmth of the treated limb on each successive application of hot water—slight variations in the temperature of the water do not effect this.

(3) A more rapid adaptation in Lead 2.

(4) An increase in the distal peripheral circulation as shown by a climbing curve in Lead 3.

We have tested 10 healthy males (ages 16 to 50) and have found similar curves in every case. Variations have, however, been met with in patients with rheumatoid arthritis and in healthy women. These are illustrated later and will be discussed.

Fig. 2 illustrates the worst type of response to the contrast bath. It is from a female aged 43, with active and severe rheumatoid arthritis in the hands



and other joints. All the features of the healthy male response (Fig. 1) are absent. The peaks of the curves are smoothed out, showing practically no reaction in the local vessels to the alternating environment, and instead of a net warming there has been a progressive cooling both of the arm in the bath and of its fellow.

The remaining charts record experiments made in duplicate. The upper and the lower parts of each chart refer to two patients on whom the experiment was made simultaneously under identical conditions, one arm of each patient being placed in a common bath. The alternating periods were 6 minutes hot and 4 minutes cold, except for the tests shown in Fig. 5 where they were 7 and 3 minutes respectively. These times were more comfortable for the patient and generally gave rise to a better total warming effect than was obtained with a 5 and 5 minute period as shown in Figs. 1 and 2.

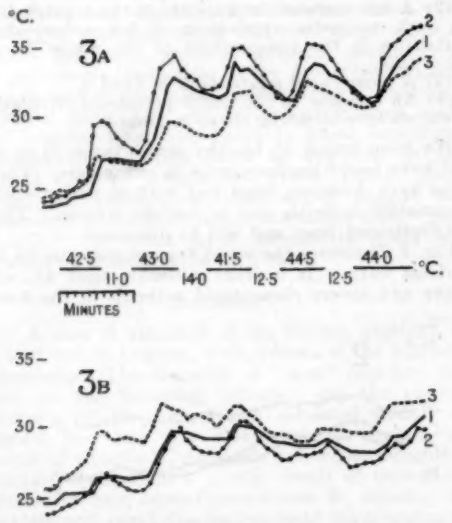
Figs. 3 and 4 record tests made on four men. Figs. 5–7 record tests made on six women. They represent the results of fifty individual experiments we have so far made with the contrast bath and they well illustrate the conclusions we have drawn from all our observations. It is necessary to discuss separately the reactions observed in males and females, for we believe there is a difference in the reaction inherent to the sex of the subject.

EXPERIMENTS ON MALES

FIG. 3A.—Male aged 53 years, with mild rheumatoid arthritis for six months affecting not more than two fingers on each hand. The disease was stationary. The temperature curves may be regarded as normal.

FIG. 3B.—A man of 53, with a more severe and progressive form of rheumatoid arthritis of six months' duration. Most of the small joints of both hands were affected as were the knees, ankles, and elbows. The temperature curves are abnormal and the flattening of the peaks in Leads 1 and 2 indicate a less complete reaction to temperature, and the net warming effect of the bath is lost after the third hot application.

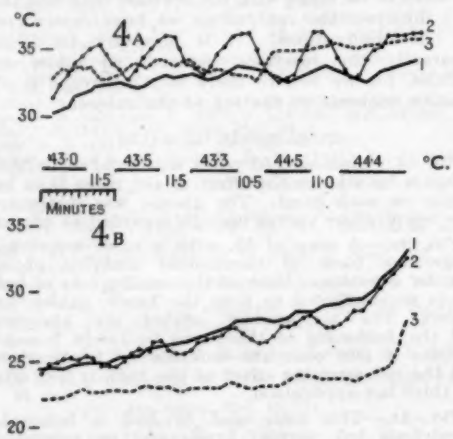
FIG. 4A.—This man aged 49 had a traumatic spondylosis but normal hands and no suggestion



of rheumatoid arthritis. The temperature curves are normal. The hands were already quite warm at the beginning of the experiment, a fact which renders the other features of the curves less pronounced.

FIG. 4B.—Male aged 49, with severe and active rheumatoid arthritis affecting hands and other joints for two years. His hands were cold at the beginning of the test. The flat form of the temperature curves show very poor adaptation of the circulation to the environment. The general warming, as a result of the treatment, took place very slowly and indeed only occurred in the exposed limb on prolonging the final hot application for 9 minutes instead of 6 minutes.

These and other experiments which we have not space to quote lead us to associate a poor reaction to the contrast bath with the more severe and active states of rheumatoid arthritis. We have not yet encountered a poor reaction in healthy males and we have therefore no evidence to suggest that rheumatoid arthritis may, in such a case as No. 4B, be grafted upon a pre-existing vascular dysfunction. Rather do we believe that the sluggish adaptability of the peripheral circulation in severe rheumatoid arthritis in men is a consequence of the disease. It is possibly analogous to the objective vascular disorder which



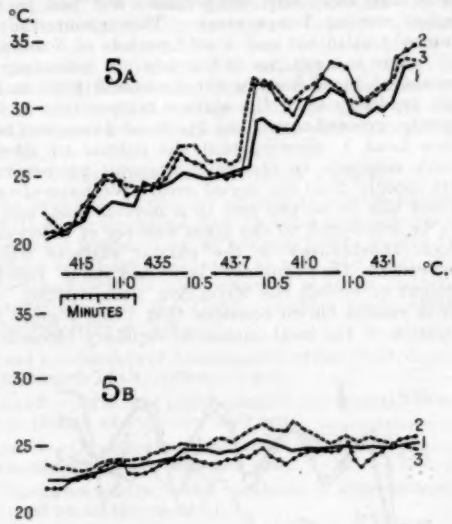
coexists with other chronic states of disuse—e.g., paralytic limbs in old hemiplegia and late poliomyelitis.

EXPERIMENTS ON FEMALES

FIG. 5A.—Female aged 26, with rheumatoid arthritis affecting some of the fingers of both hands, wrists, and elbows for two months. The patient is a well-built woman of sthenic habitus and the disease is not advancing noticeably. Her blood sedimentation-rate is only slightly increased and her grip is good though her hands are usually cold. The response to the contrast bath is good but suggests a rather sluggish adaptability of the circulation in view of the longer hot period (7 minutes) used in this experiment.

FIG. 5B.—A female aged 26 had active rheumatoid arthritis for six months. The blood sedimentation-rate is greatly increased and there has been loss of body-weight. The temperature chart shows a poor reaction to the contrast bath. The fluctuations of the skin temperature, which remain low throughout, are very slight.

FIG. 6A.—A woman of 45, suffering from general debility, but with healthy joints and no discoverable local disease. The temperature curves are very interesting because they show a very poor reaction on the part of the peripheral circulation and a failure

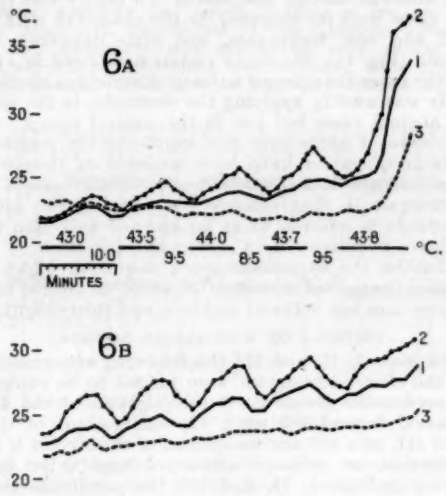


of the contrast bath to warm the limbs until the final uninterrupted exposure to hot water. We have recorded unsatisfactory temperature curves such as this in healthy younger females also.

FIG. 6B.—This woman aged 46 had chronic rheumatoid arthritis of twenty-two years' standing with much crippling and deformity of the hands. The disease is quiescent now and the response to the contrast bath is a fairly good one. Although the net warming is slight, the amplitude of the excursions of Leads 1 and 2 indicates a satisfactory adaptability of the local circulation.

FIG. 7A.—Female aged 31, suffering from sciatic pain in the right leg but otherwise strong and healthy. These curves (as those of No. 6A) indicate a failure of the peripheral vasculature to react to alterations of environmental temperature within the time limits imposed by the experiment and an absence of any general increase in the peripheral blood-flow.

FIG. 7B.—Female aged 36, with rheumatoid arthritis of an active type affecting many joints.



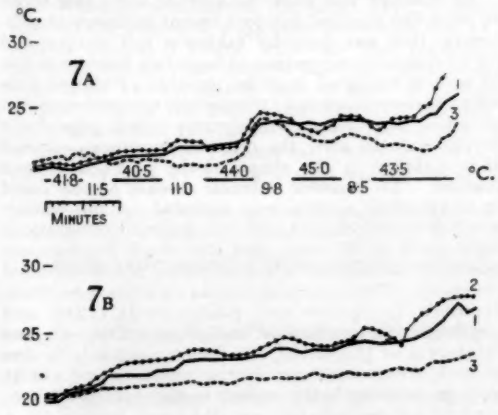
The temperature curves are similar to those in No. 7A.

The most striking fact disclosed is that a proportion of females without any arthritis (Figs. 6A and 7A) and others who are apparently in the best of health fail to react in an adequate manner to the contrast bath test. This failure is a sluggishness of adaptability of the peripheral circulation to moderately rapid alterations in the temperature of the environment. Even though our experiments are still limited in number (we have tested so far only 10 normal males and 9 normal females), it appears that this failure of adaptation is commoner in females than in males; an observation which, after all, agrees with the common experience that chilly hands and feet are commoner in women than in men under similar conditions. We must conclude also that severe or active rheumatoid arthritis affecting the extremities probably results in an attenuation of the peripheral circulation and in restriction of the speed and degree of its reaction to local temperature changes. A similar state is found in other painful or paralytic conditions which result in disuse of the limbs. When we discover, therefore, an almost complete lack of reaction to the contrast bath in a female subject with rheumatoid arthritis (Figs. 2 and 7B), we cannot say whether this deficiency is due to the disease or to a pre-existing vascular dysfunction to which rheumatoid arthritis has been added.

It is certain that restriction of the peripheral circulation—a condition which is almost as well observed in very cold hands under average conditions as by noting the failure of reaction to the contrast bath—prejudices recovery by the natural processes of repair. It may well be that the rheumatoid arthritis is graver and less tractable in patients with an inherent vascular disability. If this is so and if, as we believe, this inherent disability is much commoner in women, then this may partly explain the greater incidence of chronic and progressive forms of rheumatoid arthritis in the female sex.

Some physicians differentiate rheumatoid arthritis into what they call "primary rheumatoid arthritis" which is confined to women and in which vascular symptoms and signs are prominent, and "infective arthritis" which is usually met with in the more florid type of female and in males. We do not make this distinction, for we consider both forms to be the one disease. That type which some call "primary rheumatoid arthritis" we interpret as rheumatoid arthritis in a female already possessing sluggish peripheral vascular reactions, and the disuse following the arthritis leads to a gross exaggeration of the vascular dysfunction.

Our data make it certain that the pre-existence of a vascular defect, although it may favour a graver form of the disease and be prejudicial to its recovery, is not an essential factor in the onset and development of rheumatoid arthritis in either sex. The patients whose tests are shown in Figs. 3A, 3B, 5A, and 6B all suffered from what was indisputably rheumatoid arthritis, yet their responses to the contrast bath test are such that they could not have had a pre-existing vascular defect. We do not believe that a vascular disorder is a primary cause of rheumatoid arthritis. There is abundant evidence from other sources that the disease is most likely infective in nature. The vascular make-up of the person who contracts the disease may, however, considerably modify its course and its clinical manifestations.



SUMMARY

1. A contrast bath is described which allows the skin temperatures of an immersed forearm and distal parts to be taken. It was found that the best reaction (active contraction and relaxation of blood-vessels and increased blood-flow) is obtained when hot water is applied for 6 minutes and cold for 4 minutes.

2. Patients with rheumatoid arthritis gave poor reactions, probably because the blood-flow is attenuated in limbs disused through arthritis. Some healthy women also gave feeble reactions, probably because of an inherent lack of adaptability in their peripheral circulation.

3. This inherent defect may increase the susceptibility to, but is not the primary cause of, rheumatoid arthritis. The greater incidence of vascular deficiency in women may account for the prevalence of severe and intractable forms of rheumatoid arthritis in them.

4. It is suggested that the so-called primary rheumatoid arthritis with vascular signs and symptoms is rheumatoid arthritis (probably of infective origin) in a person with constitutional vascular defect. Disease brings the vascular failure into greater prominence.

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THE FOUR-LEAD ELECTROCARDIOGRAM IN ANGINA OF EFFORT

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THIS investigation was made to determine the electrocardiographic changes in angina of effort, with particular reference to the additional information provided by lead IV. Of 80 cases thus investigated 26 (33 per cent.) showed no changes suggestive of coronary disease in leads I, II, III, and IV, and 14 cases (17 per cent.) showed no changes suggestive of coronary disease in leads I, II, and III but definite abnormality in lead IV.

CHOICE OF CASES

An attempt was made to exclude from this series of cases the changes due to a recent coronary thrombosis; this was done by taking a full history and (in 68 cases) by comparing at least two tracings taken at several weeks' or months' interval. Patients with a past history of coronary thrombosis were not excluded provided that electrocardiograms taken repeatedly several months after the original thrombosis showed that stability in the shape of the curve had been reached. No cases of valvular disease of the heart or of syphilitic aortitis were included. A full history was taken and clinical and radiological examinations were made in all cases, and the blood Wassermann reaction was tested whenever this was considered necessary. The criteria of angina of effort were those described by Bourne and Bodley Scott (1938) and can be briefly summarised as follows. The pain was substernal or precordial, sometimes radiating to one or both arms, occurring only on exertion and not at rest, quantitative with regard to the exercise taken, diminishing immediately on rest, and lasting for a few minutes only. In a few cases cold or excitement might also bring on the pain, but this was a minor symptom and had to be elicited by cross-examination.

TECHNIQUE

The instrument used was the Cambridge Standard Electrocardiograph. Four leads were recorded: the usual three and an apical lead. At the commencement of the investigation the apex lead described by Wolferth and Wood (1932) was used, the right-arm electrode being placed on the apex-beat and the left-arm electrode between the angle of the left scapula and the spinal column. This resulted in relative negativity of the exploring electrode, giving an upward deflection on the electrocardiogram. Later, following the recommendation of the Cardiac Society of Great Britain and Ireland and the American Heart Association, we used lead IV F. In this lead the left-arm electrode is placed on the outer border of the apex-beat and the right-arm electrode on the left leg; this results in a relative positivity of the apical electrode giving an upward deflection, and relative negativity giving a downward deflection on the tracing.

Many of the electrocardiograms in which Wolferth and Wood's lead IV had been used were repeated at a later date with the new lead IV F technique, and no material change was noted. To clarify this point 17 cases were investigated on the same day with the old and new techniques, and little difference was found (Fig. 1); the slight variations noticed in a few of the cases are referred to later. Cambridge electrode jelly was used in applying the electrodes in the series of anginal cases but not in the control group. For the sake of uniformity and simplicity the results of this investigation have been recorded as though all the tracings had been taken with the new IV F technique, so that relative positivity of the apical electrode is referred to as an upward deflection and relative negativity as a downward deflection.

Besides the 80 patients with angina of effort we have investigated a control series of 42 normal men, whose ages lay between eighteen and thirty-eight.

CRITERIA OF MYOCARDIAL DISEASE

In leads I, II, and III the following abnormalities in the electrocardiogram were judged to be evidence of myocardial disease: (1) prolongation of the P–R interval beyond 0·2 sec.; (2) enlargement of Q in lead III, of a voltage one-quarter of the highest Q R S deflection, or greater; (3) low-voltage Q R S complexes in leads I, II, and III, the amplitude being less than 10 mm.; (4) widening of the Q R S to 0·1 sec. or more, with or without further changes of bundle-branch block; (5) gross an-iso-electric R S T complexes; (6) inversion of T in lead I or II or in both; (7) diphasic T waves in lead I or II, a diphasic wave being considered abnormal only if the deflection was first inverted and then vertical; and (8) deep T-wave inversion in lead III with humped S–T wave.

In lead IV the following changes were considered to be evidence of myocardial disease: (1) inverted T wave; (2) diphasic T wave; (3) absent initial wave; (4) initial wave of 3 mm. or less; (5) depression of S T complex of 2 mm. or more; and (6) T wave of high voltage, greater than 14 mm.

Pardee and Price (1938) have produced evidence of the pathological significance of R S T changes in leads I, II, and III, and Cassidy and Russell (1932) of the similar significance of low-voltage Q R S complexes in all three leads. The other changes judged to be abnormal are well recognised as signs of myocardial disease.

The changes found in lead IV are at present less well known, and it is therefore advisable to refer to certain workers' results to establish the correctness of the criteria accepted above as indicating myocardial disease.

Shipley and Hallaran (1936), examining 200 normal persons, found that the T wave was always inverted (vertical new technique). Edeiken, Wolferth, and Wood (1936) and Wolferth and Wood (1932) state that in the absence of digitalis medication an upright T IV (inverted new technique) was not seen in a normal adult, but that an iso-electric or diphasic wave with an upright component of 1 mm. had been seen in patients in whom the presence of definite heart disease could not be proved. They record a vertical T wave (inverted new technique) as an important finding. Sorsky and Wood (1937) state that the T wave is normally sharply inverted (vertical new technique) and of considerable amplitude. Under certain conditions, especially in children, it may be upright (inverted new technique) or diphasic according to the position of the exploring electrode. A shift of the electrode to the right tends to cause diminution in the positivity of the T wave. Robinow, Katz, and Bohning (1936) found that upright (inverted new technique), diphasic, or polyphasic T waves were common in normal children.

Master, Dack, Kalter, and Jaffe (1937) found that the initial positive deflection (Q wave of the old technique and R wave of the new technique)

*In receipt of a personal grant from the Medical Research Council.

was absent in 2·7 per cent. of 4500 consecutive hospital patients and small (2 mm. or less) in 3·9 per cent. In two-thirds of the patients absence of this deflection was associated with recent or old coronary thrombosis and anterior wall infarction, and in one-fifth with coronary disease alone,

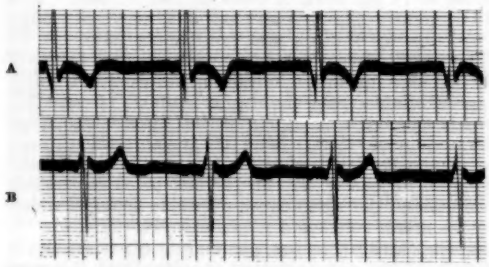

FIG. 1.—A = lead IV (Wolferth and Wood). B = lead IV F in the same patient.

with or without hypertension. The initial positive deflection was also absent in 14 cases diagnosed as acute or chronic glomerulo-nephritis, rheumatic and syphilitic valvular disease, pneumothorax, Graves's disease, and acute myocarditis. There was, in these cases, no evidence of myocardial infarction. Of the patients with a small initial positive deflection 7·5 per cent. had no evidence of cardiovascular disease. The remainder suffered from coronary thrombosis (29 per cent.), coronary artery disease with or without hypertension (37 per cent.), rheumatic valvular disease (17 per cent.), and miscellaneous heart involvement (12 per cent.). These included cases of intraventricular or bundle-branch block. Master et al. concluded that the most significant change in the precordial electrocardiogram was an absence of the initial positive deflection, which might occur when the T wave remained normal. They stated that a small initial positive deflection might have the same significance, but that it was less specific and did not indicate the site of the infarction. Sorsky and Wood (1937) found that a minimal normal Q wave (R wave, new technique) was 2 mm. in the apex-left-leg electrocardiogram, but they thought it wiser to consider abnormal an absolutely monophasic deflection.

Elevation of the R S T complex (new technique) to a maximum of 2 mm. above the iso-electric line is the limit of normal given by Sorsky and Wood. Slight depression may be normal, but the R S T take-off is usually iso-electric. Katz and Kissin (1933), Master (1934), Goldbloom (1934), and Bohning and Katz (1935) give similar findings indicating that elevation of the R S T complex (new technique) may occur normally. They do not record depression of the R T complex as a normal finding.

T waves of great amplitude were considered abnormal by Willcox and Lovibond (1937); Sorsky and Wood (1937) found one T wave of 15 mm. in their series of normals; Shipley and Hallaran (1936) record 14 mm. as the maximal normal amplitude of the T wave. With regard to W- or M-shaped Q R S complexes, Sorsky and Wood (1937), Shipley and Hallaran (1936), and Master and his co-workers (1937) found that they were not unknown normal variations.

LEAD IV F FINDINGS IN CONTROLS

As controls, 42 men between the ages of eighteen and thirty-eight were examined. Clinically they were normal and were passed fit for heavy work in a commercial firm. No cardiac enlargement was present, and radiological examination was frequently done. The blood pressures were normal in all cases. The electrocardiogram, leads I, II, and III, showed left axis-deviation in 6, slight right axis-deviation in 1, diphasic T wave in lead III in 2, an-iso-electric R–T wave in 1, and Q R S complexes of 10 mm. in all three leads in 1 case. With regard to the precordial lead (lead IV), the T waves were all vertical, the voltage varying from 2 to 14 mm.; the initial wave was usually 10–30 mm. and greater than 5 mm. in 39 cases. In 3 cases the initial wave was 4 mm. in amplitude. The S wave was small in 5 cases. The R S T complex was elevated in 30, of which 2 showed 6 mm. elevations; this may possibly be explained by the failure to use electrode jelly in applying the electrodes. Depression of the R S T complex occurred to the extent of 2 mm. in 1 case only.

COMPARISON OF LEAD IV F WITH LEAD IV OF WOLFERTH AND WOOD

In 17 patients attending the cardiographic department at St. Bartholomew's Hospital, tracings were taken on the same day by lead IV of Wolferth and Wood (1932) and lead IV F. In 9 of these cases the deflections were mirror images of one another. In 4 cases variations were present in the T wave: (1) in one of them the T wave was diphasic with the new technique, but on repetition a few minutes later it was normal—in this case the technique of Wolferth and Wood gave a normal complex; (2) the second case of the 4 showed a diphasic wave with lead IV F and a normal T wave with the old technique; (3) in the third case lead IV F showed an inverted, and lead IV (Wolferth and Wood) a diphasic, T wave; (4) in the fourth case lead IV F showed a normal, and lead IV (Wolferth and Wood) a diphasic, T wave. In 2 of the 17 cases the S wave tended to be smaller in lead IV F. In 1 case splintering of the

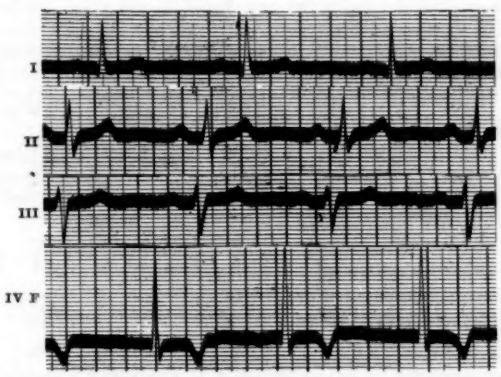

FIG. 2, leads I, II, III, and IV F.—In leads I, II, and III there is no change indicating coronary disease. Left axis-deviation is present only, but in lead IV F there is a marked inversion of T.

Q R S wave was found in lead IV F but not in lead IV (Wolferth and Wood). In 1 case of early intraventricular block the splintering or widening of the Q R S was not shown in an exact mirror image on comparing lead IV F with lead IV (Wolferth and Wood).

In all 17 cases the elevation or the depression of the R S T complex and the voltage of the initial wave were unchanged. These findings demonstrate that there is little significant difference in the results of the two methods. They suggest that a diphasic T wave in lead IV F should not be considered as strong evidence of myocardial disease. In this connexion it should be remembered that Edeiken, Wolferth, and Wood (1936) found diphasic T waves in persons in whom the presence of definite heart disease could not be proved.

ELECTROCARDIOGRAMS IN 80 CASES OF ANGINA OF EFFORT

The 80 cases of angina of effort were divided into four groups according to their electrocardiographic findings (Table I). It will be seen that electrocardiographic abnormalities were present in 67 per cent. of the 80 cases, and no abnormality was present in 33 per cent. Leads I, II, and III gave information in 50 per cent., and lead IV alone gave evidence of abnormality in 17 per cent. of cases in which leads I, II, and III were normal. An analysis of the tracings is given in Table II, and the changes in lead IV only are worth further emphasis here. In this group T-wave inversion was present in 9 cases and diphasic T wave in 2. The initial wave was absent in 2 cases, and a small initial wave of 2 mm. only was present in 1 case as the sole abnormality. The cases with absent initial waves were associated with inversion of the T wave. R S T depression of 2 mm. or more was found in 2 cases as the sole abnormality. It is of interest that in 2 cases, when the only change in leads I, II, and III was a diphasic T wave in lead I, there was definite T-wave inversion in lead IV. In 2 other cases leads I, II, and III showed as the only abnormality a Q R S complex of 0·1 sec., whereas in both of these the T wave was inverted in lead IV, in one of these cases in association with an absent initial wave and in the other with a depressed R T complex.

TABLE I—ELECTROCARDIOGRAPHIC CHANGES IN 80 CASES OF ANGINA OF EFFORT

	Cases and per cent.
Group 1.—Changes in lead I, II, or III, and lead IV	23 (29)
Group 2.—Changes in lead I, II, or III, none in lead IV	17 (21)
Groups 1 *and* 2.—Changes in lead I, II, or III with or without changes in lead IV	40 (50)
Group 3.—Changes in lead IV only	14 (17)
Group 4.—No changes in leads I, II, III, and IV	26 (33)
Groups 1, 2, *and* 3.—Changes in any of the four leads	54 (67)

TABLE II—ANALYSIS OF ELECTROCARDIOGRAMS IN 80 CASES OF ANGINA OF EFFORT

—	Group 1 (29%).	Group 2 (21%).	Group 3 (17%).	Group 4 (33%).
Previous coronary thrombosis	12	4	4	9
Prolongation P R	—	3	—	—
Q_3 enlarged	—	1	—	—
Q_3 enlarged and T_3 inverted	2	2	—	—
Q R S low voltage in all three leads	—	2	—	—
Q R S wide 0·1 sec. or more, with or without bundle-branch block	5	2	—	—
An-iso-electric R–T in leads I, II, and III	—	3	—	3
T-wave change in lead I or II, or in both	18	6	—	—
Deep T-wave inversion in lead III with humping of R S T wave	—	2	—	—
T_3 inversion not marked	2	5	2	6
T-wave inversion in lead IV	13	—	9	—
Diphasic T wave in lead IV	3	—	2	—
Large vertical T_1	2	—	—	—
Absent initial wave in lead IV	—	—	2	—
Small initial wave in lead IV	—	—	1	—
R S T depression in lead IV	3	—	2	—
Gross R–T elevation in lead IV	4	—	—	—

SUMMARY

Eighty cases of angina of effort here described show electrocardiographic changes suggesting myocardial disease in 17 per cent. of cases in lead IV only. This rate is slightly higher than that of 12 per cent. found in 62 cases by Willcox and Lovibond (1937).

The results recorded here confirm the value of lead IV as a means of obtaining information which is not available from the use of leads I, II, and III alone in the diagnosis of myocardial disease associated with angina of effort. Lead IV is valuable not only for demonstrating definite abnormalities not discoverable in lead I, II, or III but helps to confirm or emphasise the significance of minor changes which may be present in leads I, II, and III.

In one-third of cases of angina of effort it is impossible to demonstrate abnormalities electrocardiographically in spite of the use of the precordial electrode.

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AMMONIA GAS BURNS

AN ACCOUNT OF SIX CASES

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THE following six cases of ammonia burns resulted from an explosion in an ice-cream factory due to the bursting of a pipe conveying ammonia gas. They illustrate well the variety of lesions that can be produced by such an explosion. All the patients were women and were admitted to the Royal Waterloo Hospital on July 12th within an hour of the accident.

CASE 1.—Aged 21. On admission she was shocked, with a rapid pulse. She had second degree burns of the right leg and foot, the left foot, and a small area of the right cheek. The burns were similar to those produced by extreme heat. They were treated with 2 per cent. tannic acid compresses and Hexyltan jelly. The shock was treated in the usual way with heat, fluids, and stimulants. The patient recovered in a week and but for some residual bronchitis is now well.

CASE 2.—Aged 21. On admission she was shocked, and she had acute conjunctivitis of the right eye from the gas, and severe tracheitis. The eye was treated with boric acid eyewash and the installation of castor oil drops and 1 per cent. Protargol. She was given frequent inhalations of tinc. benzoin. co. for the tracheitis. Shock was treated as in Case 1. She made an uninterrupted recovery.

CASE 3.—Aged 23. She was admitted in a condition of severe shock, with persistent vomiting which at one time was slightly blood-stained. The origin of this blood was uncertain but it is more likely to have

come from the pharynx than the stomach. With rest in bed, sedatives, and heat the shock subsided and the vomiting decreased in frequency. The nervous aspect of this case was prominent and at one time the patient developed a minor delirium which manifested itself in knife throwing. After a fortnight she was discharged well.

CASE 4.—Aged 21. She was admitted for shock, and after recovering from this condition developed typical migraine with hemicranial headache and nausea, from which she had not suffered previously. The nausea responded readily to simple sedatives. Though she is now cured of her headaches she is suffering from an anxiety state which causes her to complain of feelings of fullness in the head and pains in the body. She also has some residual bronchitis, but, seeing that she suffers from mitral stenosis, the bronchitis may well have been present before the accident. Radiography shows congestion of both lung fields.

CASE 5.—Aged 36. Admitted with burns and shock. She had been subject to bronchitis previously and this was aggravated considerably by the ammonia gas. She made a good recovery, but is now left with anxiety symptoms, insomnia, and a painful scar.

CASE 6.—Aged 25. She was extremely ill on admission, with a grey face and severe shock. She had burns of both arms, the neck, and part of the face. She was given morphia gr. ¼, followed by Coramine, and ice to suck. She vomited blood, mucus, and undigested food later in the day. She was put on rectal salines, and radiant heat was applied with an electric cradle. Her face, neck, and both arms were dressed with tannic acid jelly. Castor oil drops were instilled in the eyes. Her mouth had to be cleaned out as the mucus gathered. Later continuous rectal salines were administered by drop methods and that evening she was placed in an oxygen tent. Her pulse was often imperceptible and her colour was ashen grey. She vomited a brownish fluid. Her breathing, which was laboured before she was placed in the oxygen tent, was somewhat relieved by this. There were periods of improvement. The drugs used were Cardiazol ℿ 5 in water; atropine gr. 1/100 two-hourly; morphia, gr. ¼ and strychnine gr. 1/150 four-hourly. She refused food by mouth and was practically unable to swallow. On August 14th her breathing became worse, she developed Cheyne-Stokes breathing and eventually died.

Autopsy showed four extensive burns on the right side which had been well tanned. On the left side there was a large irregular burn extending downwards from the chin and a smaller burn half way up the posterior triangle. There was extensive burning on the posterior aspect of the left arm. She also had small burns over the left anterior superior spine and below the right nipple, and a burn 11 in. long on the outer aspect of the right leg encircling two-thirds of the calf. There was a small burn below the patella on the left leg and another with considerable blistering above the ankle.

The conjunctivæ were normal. The epiglottis was swollen and red, and the trachea showed acute œdematous inflammation with mucopurulent discharge. The left lung was very congested, with œdema and, at the base, a small hæmorrhage. There was evidence of hæmorrhagic bronchitis, and desquamation and small epithelial ulcers in the bronchi. In both lungs the lower lobes were œdematous and there was generalised broncho-pneumonia. Section of the lungs showed intense congestion with acute bronchitis and broncho-pneumonia. The right lung weighed 20 oz. and was similar in appearance and findings to the left. There were numerous petechial hæmorrhages on the posterior surface of the heart over the coronary sulcus and the left ventricle, otherwise the heart was normal. The gall-bladder was congested and contained a large quantity of bile. The liver was fatty, but not congested. The spleen and adrenals were normal. The kidneys showed congestion with early hæmorrhagic nephritis. Section showed congestion of all the elements of the kidney, which may have been due to streptococcal infection from the burns. The stomach was slightly congested, otherwise normal. The intestines and bladder were normal. The urine contained albumin and blood.

The main findings therefore can be summed up as acute laryngo-tracheitis, acute tracheo-bronchitis, and acute broncho-pneumonia, with evidence of toxæmia from the burns manifested by nephritis. It would seem, looking back on the case with the post-mortem evidence before me, to have been impossible to have done more to save the patient's life, for one was simultaneously faced with toxæmia, broncho-pneumonia, and cardiac failure. Moreover, the œdema of the larynx and trachea caused the maximum of exertion on the part of the patient when breathing or attempting to swallow.

The primary factor to be treated in these cases is the shock, and subsequent oxygen tent treatment proved of great value. Tannic acid in the form of hexyltan jelly was found to be very efficient in dealing with the chemical burns.

An interesting sidelight on this accident is the relation it would bear to a gas attack in wartime. The sudden influx of even seven very ill and shocked patients needing constant medical and nursing supervision made big demands on the hospital routine organisation, and special nurses had to be secured. The method of treatment we used is similar to that which would be employed in cases of gas poisoning in war. An outstanding feature of these cases is the anxiety neurosis and the resultant disability which lasts for a long time after the patient has recovered physically. No doubt the presence of several patients suffering from the same complaint in the same ward, of whom one died, was responsible in some measure for this, and it is difficult to see how in war conditions this could be avoided.

I am indebted to Dr. D. Morris and Dr. J. Owen Walters, the house physician and house surgeon at the Royal Waterloo Hospital, for help in compiling this article.

Clinical and Laboratory Notes

TUBERCULOSIS OF THE THYROID GLAND

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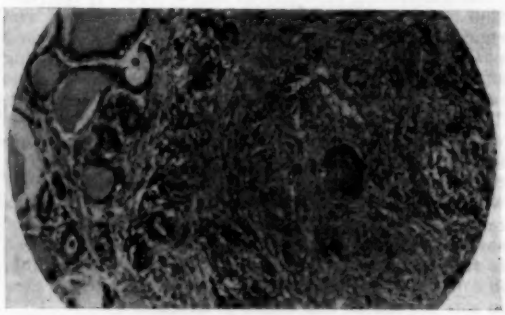
TUBERCULOSIS of the thyroid is necessarily a blood-borne infection, unless the gland be invaded by direct extension from another organ, such as the larynx or a neighbouring lymphatic node in the neck. The blood-borne infection may occur in two forms: (1) as part of a generalised miliary tuberculosis or (2) as a caseous focal tuberculosis. The first form is not of any special clinical interest. The second form is of considerable clinical interest, though relatively few examples have been described, where the diagnosis was proved by cultivation of the tubercle bacillus. It seems worth while, therefore, to print the following fully authenticated record.

CASE RECORD

The patient, a man of 26, had been treated in Liverpool Sanatorium in 1937 for pulmonary tuberculosis ten months before his transfer to the London County Council thyroid clinic at New End. His sputum

had been found to contain the tubercle bacillus, and both lungs were shown to be affected at the apexes. His general condition had improved until June, 1938, when it was noticed that he was becoming nervous, was losing weight, and had exophthalmos and tremors. On admission to New End Hospital his resting pulse-rate was 112, and he had all the ordinary signs of toxic goitre in moderate degree. He complained of a painful lump in the right side of the neck, and this was found to be a very hard nodule in the right lobe of the thyroid gland. Clinically this might have been regarded as a thyroid carcinoma arising in a small adenoma. The pulmonary history, however, pointed to the alternative diagnosis of thyroid tuberculosis, especially as it is, in my experience, very unusual for a thyroid neoplasm to give rise to toxic symptoms. The patient's sputum was found at this time to be negative for the tubercle bacillus, and there were no other signs of active disease, though radiograms of the chest suggested activity in the lungs. The presence of toxic symptoms was regarded as prejudicial to the prospects of a patient with phthisis, and in consultation with Dr. J. W. Linnell it was decided to perform a partial thyroidectomy. The usual form of anæsthesia, rectal avertin followed by gas-and-oxygen, was employed



Tuberculous granuloma of thyroid, showing giant cell.

by Dr. E. A. Seymour, this being rightly regarded as harmless for a patient with pulmonary disease. The right lobe of the thyroid was found to be hard, nodular, and very adherent to the cricoid cartilage; small tubercles were visible on its surface. The whole of the right lobe up to the midline was removed, some caseous pus escaping during the process. The right side of the cricoid cartilage was covered with granulations. These were scraped away, and the cartilage was found to be roughened, though not grossly eroded. The left lobe of the thyroid appeared to be normal, and none of it was removed. The operation wound healed without incident, and the patient left hospital a month after the operation with a normal temperature and pulse-rate. It is reported that the toxic symptoms have now almost disappeared, including the exophthalmos, and that the patient has increased by several pounds in weight.

Examination of the material removed at operation showed the typical histological structure of a tuberculous granuloma with hyperplasia of thyroid epithelium in the neighbourhood (see Figure). Culture of the caseous matter yielded a profuse growth of the tubercle bacillus.

Joll (1932) states in his authoritative treatise on the thyroid gland that "experience has shown that there is very little tendency for thyrotoxic patients to develop tuberculosis, either of the lungs or elsewhere." On the other hand, as this patient illustrates, chronic tuberculous inflammation in the thyroid usually produces toxic symptoms, which subside when the lesion has been removed. This clinical complex is a rare one. Coller and Huggins (1926) recorded five examples of tuberculosis of the thyroid among 1200 operations for goitre. The present example, however, is the only one that I have encountered among 1225 goitres removed at operation. Joll does not mention any from among his very large personal experience.

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AGRANULOCYTOSIS CAUSED BY NEOARSPHENAMINE

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Since Evans in 1916 reported a case of hæmorrhagic disease following Salvarsan (arsphenamine) treatment, it has been known that this drug may occasionally have a paralysing effect on hæmopoiesis. From Denmark one case has been reported previously by Emanuel (1933), and Plum in 1937 described another; but as Plum's patient had also had amidopyrine, the causation was uncertain. The following is a record of a patient who entered the Blegdam Hospital with agranulocytosis following treatment with Neosalvarsan (neoarsphenamine).

CLINICAL RECORD

A woman of 39 was admitted on May 24th with sore-throat and peritonsillar abscess. On April 27th a primary infection with syphilis had been proved and treatment with neosalvarsan (0·60 g.) and bismuth (0·20 g.) was instituted at once. Treatment was continued by her own doctor and she received three additional injections of neosalvarsan (on May 5th, 0·60 g.; May 10th, 0·45 g.; May 17th, 0·45 g.) and six of bismuth, each of 0·20 g., the last on May 20th. Each injection of neosalvarsan was followed by nausea and vomiting (once also by diarrhœa) and a rise of temperature to about 39° C. After May 20th the patient was confined to bed with increasing swelling and soreness of the throat.

Her general condition was fair. The temperature was 40·2° C. and the pulse-rate 112. There was a purulent nasal exudate and the pharynx showed slight trismus and much redness and œdema of the palatine arches; on the latter and on the uvula and posterior wall there were patches of whitish exudate. There was moderate peritonsillar swelling, infiltration, and tenderness. The epiglottis was swollen, especially on its left margin, with patches of greyish exudate extending on to the laryngeal surface, and date-sized glandular swellings were seen in both carotid triangles. The urine on May 24th contained nothing abnormal, but on May 26th there was bile pigment and urobilin.

On May 27th a blood examination showed hæmoglobin, 68 per cent.; red cells, 2,550,000 (average diameter of red cells, Bock's halometer, 8·1 μ); colour-index, 1·22; platelets 19,000. The plasma colour (icterus index, Meulengracht) was 22; the coagulation-time 16 min.; and the bleeding-time 30 min. The total white cell count was 250, and smears gave only small lymphocytes of normal appearance. No granulocytes were seen, and no monocytes. The bone-marrow obtained by sternal puncture was strikingly poor in cells. A differential count of marrow blood gave the following percentages: myeloblasts ½, premyelocytes 1½, neutrophil myelocytes ½, eosinophil myelocytes 0, basophil myelocytes 0, metamyelocytes 0, staff-nuclears 0, neutrophils 0, eosinophils 1½, basophils 0, monocytes 0, large lymphocytes 7, small lymphocytes 78½, plasma cells 1, pre-erythroblasts 0, basophil erythroblasts 1,

hæmoglobin-containing erythroblasts 3, megaloblasts ½, Ferrata cells 1, reticulo-endothelials 3.

The condition of the patient rapidly became worse, and on May 25th jaundice appeared and it increased in the next two days. After application of a tourniquet for half a minute there were numerous petechiæ in the cubital fossa but no hæmorrhage. The ulcerations and œdema of the throat increased, and the temperature kept about 40° C. On May 27th, three days after admission, the patient died. Blood transfusion had been given twice, 500 c.cm. each time, and liver extract (Hepsol), 5 c.cm. intramuscularly. She also had glucose-insulin (25 per cent.), 200 c.cm., and 500 million killed streptococci injected intramuscularly (in the hope of stimulating the bone-marrow).

POST-MORTEM FINDINGS

Autopsy (Dr. Bj. Vimtrup) showed extreme swelling and infiltration of the mucous membrane of tongue, pharynx, and larynx, with deep necrosis and ulcers covered by yellowish exudate extending into the œsophagus as longitudinal streaks. The right pleura was normal, but the left was adherent; and the left lung was partly compressed, with broncho-pneumonia in the lower lobe. There was œdema of both lungs but no sign of tuberculosis.

The cæcum showed moderate swelling of the lymph nodules, increasing in the transverse colon, where the individual nodules protruded (pea-sized), dry and yellowish. In the lower part of the rectum there were swollen nodules and ulcerations. The liver was slightly enlarged, firm, and of normal texture, but it was greyish-brown and slightly jaundiced and cyanosed. The kidneys were slightly enlarged with the cortex swollen and icteric and the medullary substance brown. The bone-marrow (right femur) was pale yellow and very atrophic and œdematous. All other organs examined were of normal appearance.

Histological examination revealed the mucous membrane of the epiglottis, larynx, and œsophagus to be œdematous with masses of fibrin in the tunica propria; the epithelium was replaced by thick deposits of fibrin and bacteria, the whole crowded with mononuclear cells. The lungs showed areas of congestion and œdema, and the alveoli dense masses of bacteria and detached epithelial cells. In the liver there were bacterial emboli in some of the blood-vessels, and the liver cells showed degeneration. The myocardium was congested, with a deposit of pigment and fat infiltration. Cervical, thoracic, and abdominal lymph glands were hyperæmic with hyperplastic germ-centres and increase in reticulum cells. In the spleen the germ-centres were normal in size, but there were many necrotic areas in them as well as in the pulp, with dense masses of bacteria; no leucocytes were seen. In the large intestine the necrotic swellings were found to consist of infiltration of the mucosa and œdema, with masses of bacteria and precipitated fibrin. The bone-marrow showed complete loss of the normal structure, the marrow being made up merely of fat tissue and disintegrating remnants of cells; there was no myelopoiesis whatever.

SUMMARY

1. A woman of 39 was treated for syphilis with neosalvarsan and bismuth. She was unwell after each injection of neosalvarsan, and became acutely ill with swelling and soreness of the throat when she had had 2·1 g.

2. Autopsy showed extensive necrosis of the tongue, pharynx, and larynx, and of the transverse colon and rectum. There was also atrophy of the bone-marrow.

3. Patients who prove intolerant to arsphenamine should have early and full blood examination.

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MEDICAL SOCIETIES

SOCIETY OF MEDICAL OFFICERS OF HEALTH

AT a meeting of the fever hospital medical service group of this society on Nov. 25th, with Dr. E. H. R. HARRIES in the chair, a discussion took place on

Terminal Disinfection and Exclusion of Contacts from School

Dr. DUNCAN FORBES, the medical officer of health for Brighton, said that the halcyon days of terminal disinfection were in the nineties, when in the course of disinfection a vanload of furniture including box-spring mattresses used to be removed to the disinfecting station and rooms were stripped of paper and limewashed. Although the patient was regarded as the primary source of infection, the persistence of anthrax in hides for years, of living tubercle bacilli in dried sputum and dust for months, and the development of puerperal fever with rash after childbirth weeks or months after contact with scarlet fever, all gave rise to the mistaken belief that infection lived on in bedding, clothing, dust, and the like. The discovery of the existence of diphtheria carriers, and of mild overlooked cases of scarlet fever, and the demonstration of the carriage of infection by spray gave good cause for the belief that apparently healthy carriers were the chief cause of spread in scarlet fever and diphtheria and that the part played by fomites was negligible. It was on these grounds that, in Brighton, first the orthodox disinfection of mattresses and bedding in 1910, and later spraying in 1921, were abandoned and the "spring-clean" substituted. The spring-clean consists in the boiling of sheets and pillow-slips, the washing of blankets, the dusting of bedrooms, and the scrubbing of floors. The inspector must see that this is actually carried out.

Statistics published by the Ministry of Health (Public Health and Medical Subjects No. 35) prove that the difference in results between orthodox disinfection and the spring-clean is inconsiderable, and the added cost of orthodox disinfection is not justifiable in any but exceptional conditions. In order to allay anxiety a full disinfection after scarlet fever is still carried out under certain circumstances, for instance if the patient's mother is in an advanced state of pregnancy, or in hotels and boarding-houses and the homes of dairymen. After the spring-clean had been tried out in scarlet fever and diphtheria it next replaced disinfection after cerebro-spinal fever and pulmonary tuberculosis; in the former because of the known rapid death of the meningococcus after it leaves the body, in the latter because the usual mode of infection from persons suffering from pulmonary tuberculosis is by direct spray.

Home contacts after measles have not been excluded from school in Brighton since 1922. The reasons for this are (1) that such exclusion, after the first crop of cases, does not prevent a general infection of the school, (2) that home contacts when excluded play with and infect neighbours' children who are at an

age when case-mortality is high and who cannot be offered prophylactic injection of adult serum. Chickenpox contacts are not excluded because it is a real advantage to get the attack over in childhood. With regard to scarlet fever, since 1932, whether the patient was removed to hospital or isolated at home, school contacts have been excluded for one week only without any apparent bad results. Seeing that in Brighton 55 per cent. of scarlet fever cases are now nursed at home, this leads to a great saving in school attendance.

Dr. ANDREW TOPPING said that terminal disinfection is a survival from very early times when, there being complete ignorance of how infection was spread, herbs and other materials were burned to combat miasmata or pest-bearing emanations. It is difficult to understand its persistence in our enlightened age. We know that the organisms responsible for infectious diseases are extremely short-lived outside the human body, and that infection does not normally lurk behind picture rails or in the depths of a mattress but is almost invariably due to the direct passage of the causative organism from the throat and nose of a sufferer or carrier to those of a susceptible contact. And yet, in deference to a completely uninformed public opinion, we continue the hoary ritual of disinfection. Why do we do it? Obviously because we have to play for safety in the absence of an authoritative lead from our rulers. No matter how convinced he may be of the folly of the approved hocus-pocus no medical officer can be blamed for playing for safety if he knows he is to be shot at in council, press, or law courts if a second case arises and he has not burned his votive sulphur candle or sprinkled chloride of lime round the gullies. And yet for more than forty years writers on public health have praised with faint damns, or have actually decried, routine terminal disinfection.

In America terminal disinfection has been almost completely discontinued and there has been no evidence whatsoever of any corresponding increase in incidence. In this country several medical officers of health have to all intents and purposes abandoned it with excellent results, but most continue part of the ritual as a placebo. Dr. Duncan Forbes led the way in Brighton and had no cause to regret his action. The medical officers of many provincial towns and of certain metropolitan boroughs have done the same and, instead of any increase in incidence of infectious disease, there has in many instances been an actual diminution. Thirty years ago the late Dr. F. Thompson, then medical superintendent of the North-Eastern Hospital, discontinued disinfection of wards changing over from one disease to another: a thorough washing, full free ventilation for 6–8 hours, and change of bedding was all he insisted on. His results continued to be at least as good as when the full ritual was carried out.

No one can deny that, under certain circumstances, micro-organisms—for example hæmolytic streptococci—can survive for considerable periods outside the human body and retain their pathogenicity. Recent experiments by Dr. Elizabeth White at Queen Charlotte's Hospital show that they can be recovered from dust: the moral is obvious, *remove the dust*, and I know of no better way of doing this than by a liberal use of soap, water, elbow-grease, and free full ventilation. The streptococcus that survives this for 24 hours must indeed be a stout fellow, and the odds against his being laid low by a variable concentration of sulphur or formalin fumes would be very heavy. Even if he is entrenched in saliva or mucous discharges he cannot resist direct applications of soap and water.

As regards bedding and other fomites, my opinion is that, as in the case of rooms, the high standard of disinfection prescribed is not justified by our knowledge of the viability of the organisms and the modes of transmission. It is not normally necessary to subject mattresses to steam disinfection. Unless the organism soaks into the depths in the patient's discharges it is difficult to visualise how it gets there through nightgowns, draw sheet, sheets, mackintosh, and ticking. It is just as difficult to see how it finds its way out and retains enough vitality to cause disease. When we remember that myriads of these same organisms are living in rude health in the throats and noses of people we meet in our normal life, it seems somewhat supererogatory to spend money, time, and trouble in ruining mattresses on the off chance that some emasculated little orphan has found its way into their recesses. Where, for any reason, steam disinfection is really indicated let it be reasonable. There is no justification for applying the standard necessary to kill anthrax spores or for getting surgical sterility if the potential infection is attributable to non-resistant organisms such as the *B. typhosus* or the hæmolytic streptococcus.

In the common infectious diseases of respiratory origin where current disinfection has been sensibly carried out no final disinfection other than cleansing the room with soap and water and allowing free ventilation is necessary: bed-linen and blankets should be washed and mattresses stripped and exposed to fresh air. Most of us feel in our hearts that this is all that need be done, but until we become vocal, until the powers that be come down definitely on our side, and until we get the concurrence of the general body of medical practitioners, public opinion, unaware as it is of the real modes of transmission of these diseases, will, I am afraid, resent any change.

Routine, rule-of-thumb exclusion of contacts is as much of an anachronism as was routine closure of schools. It argues either ignorance of epidemiology or unwillingness to face up to its teaching; the teaching of Chapin, Rosenau, Kerr, and many others has indeed fallen on stony ground. We still insist on the letter of the law and exclude from school all susceptible—and often unsusceptible—children who are known to have been in contact. We shut our eyes to the fact that in epidemic periods almost every child is a contact of the disease, and confine our elaborate pretence of isolation only to those whose contact with a known case is demonstrable. We keep exposed children away from our healthy, well-ventilated schools and allow them to be in close contact with the younger and more susceptible children at home and in the streets. They play, go to cinemas, and generally mix at will out of school hours with their fellows from whom our kindly forethought has separated them for some four hours. It is one of the best demonstrations of the ostrich technique that even our illogical public health regulations can provide.

The results of observance of this fetish have never been statistically worked out. What proportion of excluded contacts actually do develop the disease? Probably not more than 0·5 per cent. What does exclusion cost in terms of lost education, grant, and so on? We all know that contacts as such, other than those who chance to be carriers—and this carrier state is largely independent of the contact for which they are excluded—do not convey infection. It is not until the prodromal malaise or catarrh manifests itself that the child is infectious. And where is this

condition more likely to be promptly recognised and where is transference of infection more likely to take place? In school with constant wide-awake supervision by teachers and school nurses in clean airy conditions, or in a stuffy home with a busy mother and a crowd of youngsters below school age? I am satisfied that exclusion of children in industrial areas is an insult to our intelligence and mumbo-jumbo of the worst type.

The position is different if you are dealing with an isolated case of any disease and where the conditions either of the home or of the locality are such that contacts can actually be segregated from other children. But, where the disease is established in an industrial area, pretended segregation of one small batch of the thousands of contacts is a waste of time and money. Variations in susceptibility are much more important than variations in the intimacy of contact, and no one, medical or otherwise, can postulate which of two children, one known to be exposed and the other only presumed to be, is likely to prove the greater danger to his fellows. I realise that any move to stop indiscriminate exclusion will be met by public outcry. Exactly the same thing happened when routine school closure was abolished and when the modified system of exclusion in measles epidemics was adopted. All are agreed that both these measures have not resulted in increased incidence but have brought cases under treatment at a much earlier stage. Surely it is time for us as a profession to give an unequivocal lead in this important matter.

Dr. MAURICE MITMAN said that there is no significant difference in the occurrence of secondary cases when terminal disinfection of the old type is abolished. His views, which he maintained are the current views of administrators of fever hospitals, are based on the sources and modes of infection. The vast majority of the inhalation diseases are contracted by the close proximity of the new host to the infected person, the transmission of droplets taking place from one nasopharynx to the other. The effective range of such droplets is relatively small and the life of the organism outside the body is relatively short. Droplets suspended in the air are dispersed by ventilation, and most of the organisms in them die as the result of drying and sunlight, so that their concentration in the air is rarely sufficient to initiate an attack except in the vicinity of an infected person.

Organisms in droplets and discharges deposited on inanimate objects are in like manner destroyed by sunlight and drying. Those which remain viable form part of the dust and may be inhaled, but the concentration is seldom sufficient to result in disease, particularly if the dust has lain for some days. The viability of the organisms deposited on inanimate objects is influenced by the organic matter—e.g., mucus and grease—in which they are embedded. A detergent like ordinary soap and water is therefore a good disinfectant. The efficiency of soap and water is demonstrated in cubicle and chamber nursing. The hands of an attendant are much more likely conveyors of infection than inanimate objects and are more difficult to clean, but washing seems to be adequate. In alimentary infections insanitary disposal of excreta and unhygienic handling of food resulting in the contamination of food and drink are the chief factors. Inanimate objects, except bed-linen, play little or no part. If these views are correct, persons and not inanimate objects are mainly responsible for the spread of disease.

Concurrent disinfection of the discharges from the upper orifices of patients with respiratory diseases, and of the excreta of patients with alimentary diseases, is therefore particularly important. Except in special circumstances, terminal disinfection need be simple only: removal of dust by a vacuum cleaner or damp sweeping; throwing open the windows to clear the air; simple laundering of bed-linen and underclothes; exposure of mattresses and top clothes to air and sunlight; disinfection of utensils by boiling; destruction of toys and books by burning; and scrubbing inanimate objects with soap and water.

BRITISH ORTHOPÆDIC ASSOCIATION

THE annual meeting of this association was held in Birmingham on Oct. 21st and 22nd under the presidency of Mr. NAUGHTON DUNN.

Mr. H. J. BURROWS read a paper on *coxa plana* which was an epitome of the essay for which he had been awarded earlier this year the Robert Jones medal and prize of the association. He described the essential histology of coxa plana as (*a*) an atypical subchondral necrosis involving lysis of trabeculæ and (*b*) ingrowth of phagocytic and reparative young mesodermal tissue. The radiological criterion was destruction of trabeculæ. Coxa plana could not be regarded as due to complete arterial obstruction, for in lesions resulting from the latter—e.g., aseptic necrosis of the femoral head after subcapital fracture—the normal architecture and texture of the bony trabeculæ were preserved a long time. Arterial obstruction alone did not produce the typical changes and he felt, though he had been unable to prove, that venous obstruction and/or hæmorrhage into the bony nucleus of the femoral head might play an important part. Infection, though unlikely, could not be ruled out entirely as a causal factor.

Mr. F. G. ALLAN described the method that he uses for *bone lengthening*. From an analysis of the large series of patients on whom he had performed lengthening operations he concluded that 2 in. lengthening could be safely and easily obtained, that tibial lengthening was more certain and easier to control than femur lengthening, and that many of the complications experienced by other surgeons were due to extensive and unnecessary stripping of the periosteum and damage to the soft tissue.

An *operation for calcaneo-cavus* was described by Mr. BRYAN MCFARLAND. The essential steps of the operation are the removal of a substantial wedge of bone from the posterior third of the os calcis and its insertion into a niche on the dorsal surface of the neck of the astragalus, close to the articular surface for the tibia. If the wedge is inserted accurately it forms a block to excessive dorsiflexion.

A paper on *osseous dystrophy following icterus gravis neonatorum* was read by Dr. FRANCES BRAID. Two patients were described who had a disease characterised by (1) jaundice of the familial icterus gravis type at birth with acholia, (2) pathological pigmentation of the skin, and (3) a generalised cystic condition of the bones, which developed some time after birth. Dr. Braid said that the bone disturbance possibly represented an accompanying developmental defect, or it might be secondary to cirrhosis of the liver (present in both patients), which could very well have disorganised the storage and utilisation of vitamins.

Mr. T. S. DONOVAN gave a detailed account of five patients who had suffered from *tuberculous infection of the subgluteal bursa*. He pleaded for

early excision, because immobilisation of the hip in recumbency had proved ineffective.

The pathology of *snapping jaw* was discussed by Mr. A. C. ARMSTRONG, who described an operation for the removal of the torn meniscus. Through a short oblique incision in front of the ear the zygomatic arch is exposed and ½ in. of it removed (to be replaced at the end of the operation) immediately in front of the eminentia articularis. This procedure gives a clear view of the anterior and antero-lateral aspects of the joint, and excision of the meniscus is easy. In the two patients on whom the operation was performed a temporary paresis of the frontalis muscle developed, but recovery was complete in a few weeks.

Dr. J. F. BRAILSFORD showed radiograms of various *bone dystrophies* in patients with whom he had been able to keep in touch from childhood to adult life. He discussed the relationship between epiphysiolysis of the upper end of the femur and renal rickets, and described in detail the radiological appearances in the "pre-slipping" stage. He regarded infantile coxa vara as a localised bone dystrophy. Similar bone changes were sometimes seen in cleidocranial dysostosis and in Albers-Schönberg disease.

Mr. SAYLE CREER described 36 patients in whom *non-traumatic dislocation of one or more toes* at the metatarso-phalangeal joint had occurred—most of them in association with hallux valgus and metatarsal arch defects. Pes cavus was present in only one patient. In three there were plantar sinuses leading down to the dislocated joints. Mr. Creer disagreed with Branch's theory that the dislocation is produced by the interosseous muscles, and he demonstrated in a film that these muscles on faradic stimulation had an action quite different from that ascribed to them by Branch. It was therefore concluded that the extensor tendons were the dislocating factors (in association with deformities already present). Treatment consists in tenotomies of the extensors in the early stages. When the dislocation is long established, excision of the base of the phalanx is necessary.

ROYAL ACADEMY OF MEDICINE IN IRELAND

AT a meeting of the section of obstetrics on Nov. 4th, with Dr. R. M. CORBET in the chair, a paper on

Transfusion in Infancy and Childhood

was read by Dr. W. R. F. COLLIS. He began by analysing 102 consecutive cases, 64 being in infants and 38 in older children. In the first group he laid particular emphasis on the importance of transfusion in the neonatal anæmias, including icterus gravis, hæmolytic anæmias, and anæmias secondary to melæna neonatorum and other conditions. In acute infections he had not found transfusion of any great help, but in chronic infection, especially when it was associated with anæmia, improvement had been noticed—e.g., in marasmus associated with empyema in older children. He considered that the direct method, by which blood was passed direct from the donor to the baby without citration was less likely to cause reactions and was more beneficial than the indirect citrate method. At the Rotunda Hospital and the National Children's Hospital he used a Soresi 2-c.cm. transfusion syringe, as supplied by the Modern Surgical Supply Company, Brooklyn. Once learnt, the technique was extremely simple; indeed he had transfused three babies, all weighing less than 5 lb., from a single donor, the whole procedure taking only 35 minutes.

Dr. NINIAN FALKINER showed a colour film of Dr. Collis's technique.

Dr. R. E. STEEN congratulated Dr. Collis on having introduced this procedure into Dublin. In hæmophilia transfusion was undoubtedly very useful; it was also good in melæna neonatorum. In these cases the missing factor was supplied by transfusion. In icterus gravis also transfusion could be of definite value. In the secondary anæmias, in which the hæmoglobin but not the red cell count was reduced, he thought that iron was better than transfusion. In conditions where the red cells were more reduced than the hæmoglobin transfusion might be suitable. In septic cases transfusion was certainly not of value. In marasmic children it could be tried, but he was not satisfied that it helped. It should always be remembered that there was a slight risk from transfusion. Overloading the right heart was a possibility that had to be considered.

Dr. G. C. DOCKERAY said that in very young children blood-grouping did not matter. He thought a Wassermann test should always be done before any donor for a transfusion was chosen. In the Mayo Clinic six cases of transmission of syphilis by transfusion had recently been reported. The donor should also be asked if he were sensitive to any foodstuff, and his serum should be tested against the patients' corpuscles.

Dr. APTHORP said that the technique used by Dr. Collis was not very difficult to learn, but there must be two, or possibly three, assistants who knew exactly what the method was and how it was done. Because of this, it was a method which could be used only in a children's hospital where every facility was available.

Dr. A. W. SPAIN thought that there were many conditions in which transfusion would be of very doubtful value and would possibly be harmful, giving examples from his own experience.

The CHAIRMAN said that in cases of sepsis transfusion was a two-edged weapon. He had no doubt there were some cases in which transfusion was absolutely life-saving—e.g., in uterine infection without septicæmia but with profound and rapidly increasing anæmia. He had seen three cases in which the anæmia was so bad that he was afraid even to examine the patients, and he had also seen cases in which any movement produced tachycardia. In this sort of case transfusion made a great difference. In any patient with septicæmia, however, it was necessary to be very careful about transfusion, not only because it might do harm but also because it was not always easy to get blood which was compatible. Where there was blood infection it was necessary to take the most particular precautions against these risks.

Dr. COLLIS, in reply, said that transfusion, like oxygen, should not be used as a last resort. In cases of rapidly advancing anæmia due to sepsis it was of great help, but it was not appropriate for every possible occasion. It was of great value in the hæmolytic anæmias of the new-born; in the general septic group of cases it was useless except as an adjunct to other treatment; in marasmus it was successful only when the baby was anæmic. In the ordinary maternity hospital not nearly enough transfusions were done. It was only by the maternity hospitals taking charge of new-born infants that the infantile mortality-rate could be reduced.

REVIEWS AND NOTICES OF BOOKS

The Abnormal in Obstetrics

By Sir COMYNS BERKELEY, F.R.C.P., F.R.C.S., F.C.O.G., and VICTOR BONNEY, F.R.C.S., both Consulting Obstetric and Gynæcological Surgeons to the Middlesex Hospital; and DOUGLAS MACLEOD, F.R.C.P., F.R.C.S., Assistant Obstetric Surgeon to St. Mary's Hospital. London: Edward Arnold and Co. 1938. Pp. 525. 18*s*.

THIS book has been written for candidates preparing for one of the higher examinations in obstetrics with a view to specialising, and familiarity is assumed with the contents of a standard obstetric text-book. No details are given of anatomy, physiology, and operative procedure and there are no illustrations. In the first half of the book consideration is given to the effect of pregnancy upon certain diseases from which the expectant mother may suffer and to the converse. This part, though well written, is difficult to read. The reader never knows what surprise will await him on the next page; in the course of a few lines he will leave the nose for the ear and the eye, and then comes across jaundice. Sections are devoted to such rare conditions as splenic anæmia, Hodgkin's disease, paraplegia, typhus, and elephantiasis, complicating pregnancy. Clearly much work has been put into the assembling of information on the action and reaction of each of these morbid states on pregnancy, due attention being directed to the commoner ones. The chapter upon chronic heart disease is excellent; that which describes the toxæmias of pregnancy is little more than a synopsis of what may be found in a standard text-book. A short chapter by Sir Hubert Bond on mental disorder in association with childbearing contains useful hints.

The second part is concerned with the abnormalities that may occur in labour. Here the teaching is as emphatic and sound as might be expected from authors of such authority. Reasons are given for every piece of advice offered, which follows orthodox teaching for the qualifying examinations except in one respect, viz., that more prominence is given to the importance of a surgical outlook. "Pregnancy," we read in the introduction, "is a state induced by a neoplasm. It terminates in the removal of the new growth by an operative process. . . . The obstetric art is therefore basically a branch of surgery." And this insistence on rigid surgical technique tends to distort the outlook and function of a specialty which should combine that of surgeon and physician. The book concludes with a useful chapter by Dr. H. L. Marriott and Dr. A. Kekwick on blood and saline infusion, a good account of anæsthesia in obstetrics, and an exhaustive bibliography.

Obstetrics, perhaps more than any other branch of medicine, must be learnt by experience rather than from books. Candidates for most of the higher examinations succeed not because they are acquainted with rare and abnormal conditions, but because they show evidence of having practised the art and can produce sound and sensible arguments about the more common dangers that may be encountered in the process of childbirth.

It is those who have already mastered the contents of a good obstetric text-book, and have had enough practical experience to be able to differentiate between the ideal and the real, who will benefit most from this epitome of the invaluable contribution made by the Middlesex school to current obstetric theory and practice.

Modern Methods of Feeding in Infancy and Childhood

Sixth edition. By DONALD PATERSON, B.A., M.D., F.R.C.P., Physician for Diseases of Children to the Westminster Hospital; Physician to the Hospital for Sick Children, Great Ormond-street; and J. FOREST SMITH, F.R.C.P., Physician to St. Thomas's Hospital. London: Constable and Co. 1938. Pp. 221. 7*s*. 6*d*.

IT has not been found necessary to alter this valuable handbook much, though its last edition appeared three years ago. As before, the main emphasis is on the importance and successful management of breast-feeding; it is regrettable that it is still necessary to labour the fact that breast-feeding is the best method, ancient or modern, of rearing babies, and the authors' forthright discussion of the subject should do much to convince the many mothers who do not see why they should bother with it. For the establishment of lactation, the expression of "semi-coagulated" breast secretion is recommended for the few days immediately before and after parturition, and we note that mothers are still advised to practise the heroic treatment of scrubbing their nipples with a nailbrush during pregnancy. The new regulations regarding the various classes of milk available in this country are explained, a number of references to recent papers have been added as footnotes, and fresh examination papers substituted in the appendix. And with this new coat of paint the familiar ship sets out on another successful voyage.

British Periodicals of Medicine

A Chronological List. By W. R. LEFANU, M.A., Librarian, Royal College of Surgeons of England. Baltimore: Johns Hopkins Press. 1938. Pp. 93. $1.25.

IN a slender reprint from the 1937–38 volumes of the *Bulletin of the History of Medicine* the librarian of the Royal College of Surgeons has produced a fascinating and comprehensive bibliography of British medical periodicals from 1684 to the present day. Similar lists have been compiled for the Dominions and for other countries, but this is the first to cover the Empire as a whole. The entries, of which there are over 1300, are arranged chronologically, and as far as possible Mr. Lefanu has indicated at what libraries each may be found. Part 1 covers the period up to 1899, and Part 2 the twentieth century.

In the seventeenth century scientific men made their views and discoveries public in separate treatises and kept one another informed by private correspondence. The earliest periodicals (as distinct from spasmodic issues) which published original medical papers were the transactions of general scientific societies. The second number of the *Philosophical Collections* of the Royal Society, for instance, published in 1681, contained ten medical articles out of a total of fifteen. General scientific journals are, however, excluded from Mr. Lefanu's collection, so that the list starts with adaptations of the early news-sheets—little more than treatises in serial form. Next came the proceedings of medical societies, and it was not until the end of the eighteenth century that medical journals proper made their appearance. Even then their infant mortality approached 100 per cent., and *The Lancet*, born in 1823, was the first to survive more than a few years. *Guy's* and *St. Thomas's Hospital Reports* began in 1836, though the latter

was then discontinued until 1870. Next came a wave of ephemeral journals devoted to the medical fashions of the time—mesmerism, phrenology, and the like—and in the 70's and 80's the rise of specialism was reflected in the appearance of *Brain*, the *British Journal of Dermatology*, and *Public Health*. At the same time more and more journals appeared in the Dominions and Colonies. With the opening of the present century psychology, eugenics, and tropical medicine assumed their independence, and the nursing profession began to make itself heard. Since the war there has been an almost bewildering increase in local journals, many of them of more than topical and parochial interest.

Through this maze Mr. Lefanu acts as a reliable guide. Much trouble has clearly been taken to make the list complete, and, though more short-lived journals will no doubt come to light, it is unlikely that there are any serious omissions. Our one regret is that the indexes of the two parts are not combined.

La maladie de Lobstein

By GEORGES CARRIÈRE, Professeur de Clinique médicale à la Faculté de Médecine de l'Université de Lille; CLAUDE HURIEZ, Professeur-Agrégé à la Faculté; and WILLIAM HOCQ. Paris: Doin et Cie. 1938. Pp. 162. Frs.40.

THE syndrome of brittle bones and blue sclerotics, with its well-marked family incidence, has been often observed but is little understood. A new thesis on the subject might be of value to the student of heredity if the literature and family histories had been studied at all exhaustively, or to doctors as a whole if any fresh fact of importance in ætiology or treatment had been brought to light. Unfortunately this monograph satisfies neither of these requirements. The authors believe that congenital syphilis is a factor of great importance in ætiology. Their view is unlikely to carry any general conviction because they have given quite disproportionate attention to French publications, and in France congenital syphilis appears either to be actually much commoner or to be diagnosed on criteria a great deal less rigid than those obtaining in other countries.

A Textbook of Histology

Third edition. By ALEXANDER A. MAXIMOW, late Professor of Anatomy, University of Chicago; and WILLIAM BLOOM, Associate Professor of Anatomy at the University. London: W. B. Saunders Co. 1938. Pp. 668. 30*s*.

Maximow and Bloom's text-book took a leading place on its first appearance in 1930, and this third edition maintains the standard then set. Prof. Stephen Polyak has taken over the section on the nervous system from Prof. Herrick and has largely rewritten it, incorporating much recent work on histo-physiology; he has included an account of his own work on the functional analysis of the structure of the eye. The description of the innervation of the ear has also been modified, but no mention is made of Hallpike's important work on the character of the bony labyrinth. Dr. Boyden has contributed an interesting and detailed account of the choledocho-duodenal junction.

Among many other additions we note that of the most recent work on the endocrines, though the glomus caroticum is still included amongst the paraganglia. The section likely to arouse particular interest is that dealing with the mesenchyme and the potentialities of its cells. Although new observations, such as those of Glimstedt, are fully recognised, the teaching here is still that the Flemming "germinal centre" is the chief source of the lymphocyte and that the small lymphocyte is to be regarded as a pluripotential cell, though this latter view is not maintained so dogmatically as in previous editions. The views of other workers on this and other controversial questions are, however, stated quite fairly and there is no suggestion of undue bias. The weakest section of this work is that on the vascular system; the notes on arterio-venous anastomoses are extremely sketchy and Gross's work on the vascular supply of the normal heart valve is ignored. The illustrations, both half-tone and coloured, are of a very high standard and the revision of the text is so thorough that even those who have copies of previous editions will find it well worth while to acquire this new one.

Chemistry of the Sterids

By HARRY SOBOTKA, Chemist to the Mount Sinai Hospital, New York. London: Baillière, Tindall and Cox. 1938. Pp. 634. 38*s*. 6*d*.

MOST of the books on the chemistry of the sterols published in recent years have been written in German and an up-to-date summary in English of this important group of substances is most welcome. The main and most valuable section of the monograph is the list of compounds, with their properties, such as melting-point, methods of preparation, salts, and derivatives. This extends from p. 169 to p. 496 and thus constitutes the greater part of the book; the bibliography is particularly full, occupying another 61 pages. The chapters introductory to the list of compounds refer to the history of chemical work in the sterols and to the technique used in discovering their properties, including methods of disintegration, the constitution of cleavage products, and so forth. The question of synthesis is barely touched. It is a pity that these early chapters are so condensed as to be sketchy; their expansion would be well worth while in a work of reference of this quality.

NEW INVENTIONS

A PIN EYE-DROPPER

IN the treatment of eye diseases oily preparations of alkaloids are often more effective than watery solutions. For example, eserine in the palliative treatment of chronic glaucoma and homatropine in refraction work are best given in castor oil. The oily preparations also keep better. The main reason why they are less used than they might be is their messi-

ness. This arises from too much being put into the eye by using a glass rod or dropper. The pin eye-dropper here illustrated meets this difficulty. It is an ordinary domestic pin fixed into a suitable handle, and the whole chromium plated. If the head only of the pin be dipped into the oil it will lift a globule of the right volume, which by a touch on the mucosa of the lower lid is transferred to the eye. The dropper can be boiled. It is made by Messrs. W. Martindale, of New Cavendish-street, W.1.

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THE LANCET

LONDON: SATURDAY, DECEMBER 10, 1938

THE SURGERY OF EMBOLISM

RECORDS of embolectomy are seldom seen in our medical journals, and this suggests that the operation is little used. The present interest in antispasmodic and anticoagulant drugs may lead to its neglect. Yet embolectomy is a rational procedure, and JEFFERSON, who was the first English surgeon to perform it successfully, has never ceased to recommend it. This week we publish a report in which one of his associates in Manchester, Mr. D. LL. GRIFFITHS, makes an opportune appeal for its continued use and describes the first successful removal, in this country, of an aortic embolus.

The purpose of operation for embolic occlusion of the large arteries is to prevent gangrene of the limbs. The danger of gangrene is greater after embolism than after ligature—partly because of the secondary results of the embolism, and partly because of the cardiac disease that causes it. Large series of embolectomies have been reported from Sweden (EINAR KEY and others) and America (PEARCE, DANZIS, LUND), and all show that if operation is undertaken a few hours after onset some two-thirds of the limbs can be saved. It often happens that the cardiac condition kills the patient shortly after operation, but clearly the risk of death is much increased by the onset of gangrene, and the operation itself is seldom fatal. Except the abdominal approach to the aorta, these operations are trivial and well tolerated, and it is doubtful whether the abdominal approach to the aorta is ever justified. In the arm the risk of gangrene is so much less than in the leg, and spontaneous recovery from brachial embolism is so common, that some surgeons, such as LUND,[1] say that this condition need not be operated on. GRIFFITHS makes the interesting suggestion that emboli in the carotid should be removed. The fact that in fatal embolic hemiplegia clot is found in smaller vessels does not exclude the possibility of its lodgment at the carotid bifurcation with subsequent fragmentation, part of the clot passing into the external carotid with no ill effects. If operation were undertaken early the rich anastomosis of the circle of Willis should suffice to wash a clot back from the internal carotid to an opening in the common carotid.

In France the operation usually advised for embolism is arterectomy. This is based on the teaching of LERICHE, who states that the artery at the site of obstruction acts as a centre of sympathetic discharges causing peripheral vasoconstriction. Excision of the affected segment of the artery is performed in early cases after embolectomy or in late cases as an alternative to it. FUNCK-BRENTANO,[2] in summarising French views on arterial embolism, lays emphasis on this sympathetic disturbance, and his scheme of treatment is directed as much against it as against the local obstruction. The present vogue for treatment with antispasmodics is in accord with French opinion, but it does not justify the abandonment of embolectomy. At the same time the results of operation should certainly be improved if potent antispasmodics and anticoagulants are brought to its aid. In heparin we now have an efficient anticoagulant whose use should prevent clotting at the arterial suture line. As for the antispasmodic drugs, if they too are efficient there should be no advantage in arterectomy, except in cases where a diseased segment of an artery is a source of small emboli causing gangrene of digits.

When we turn to pulmonary embolism our hopes must lie mainly in prevention. A not unimportant means to this end is to get rid of the idea that pulmonary embolism is a post-operative accident occurring on the tenth day. By inquiring into a large series of fatal cases in the teaching hospitals of London PILCHER[3] has shown that it is common among medical as well as surgical cases, and that its time-relation to operation is very varied. Any scheme of prophylaxis for the first few post-operative days will touch only a part of the problem, and failing deeper knowledge of biochemical causes we shall do well to remember the mechanical factors on which ASCHOFF laid stress—factors that we can to some extent control. Even the cause of death in this condition is not as obvious as it may seem, for in fatal cases one often finds a degree of arterial obstruction that would clearly have been compatible with life. Again, surgical ligature of one pulmonary artery is well tolerated, whereas a much smaller arterial occlusion by embolus may be fatal. The explanation has been sought in reflex disturbances, and VILLARET, JUSTIN-BESANÇON, and BARDIN[4] conclude from animal experiments that rapid deaths are not due to obstruction but rather to reflexes set up by the emboli, such reflexes being more potent when emboli can reach the small branches of the pulmonary arteries. Treatment they believe should be directed against these reflexes, and they recommend not only drugs—of which papaverine is perhaps most widely used—but also, in the syncopal type, artificial respiration. HOCHREIN and SCHNEYER,[5] postulate a pulmono-coronary reflex involving spasmodic occlusion of the coronary arteries. Whatever may be the strength of these hypotheses, there remain a few cases in which the embolus is so large that death is inevitable, and it is for these cases that PILCHER[6] recently recommended

[1] Lund, C. C., *Ann. Surg.* 1937, **106**, 880.

[2] Funck-Brentano, M. P., *Rev. Méd.*, October, 1938, p. 431.
[3] Pilcher, R., *Brit. J. Surg.* 1937, **25**, 42.
[4] Villaret, M., Justin-Besançon, L., and Bardin, P., *Rev. Méd.*, October, 1938, p. 393.
[5] Hochrein, M., and Schneyer, K., *Münch. med. Wschr.*, 1937, **49**, 1929: see *Lancet*, 1938, **1**, 450.
[6] Pilcher, R., *Lancet*, Oct. 22nd, 1938, p. 942.

embolectomy. Unfortunately at the onset it is hard to distinguish embolism with a large clot from embolism with a small clot plus a profound reflex disturbance; but if after a few hours there is no response to conservative measures it is probable that a large clot is present and operation should be attempted. No successes have yet been reported in this country, and only about 10 are on record. The operation is very different from peripheral embolectomy and is a desperate remedy. Few surgeons would undertake it until quite certain that without it death was inevitable; but it may occasionally be possible to deduce this while there is still a chance of saving the patient.

LIABILITY OF A SANITARY AUTHORITY

THE Croydon typhoid outbreak of a year ago was far from negligible—322 primary and 19 secondary cases, and 43 deaths. The Murphy committee carefully examined the facts and assigned the causes. Knowledge of the causes meant knowledge of the points at which the Croydon corporation had failed to prevent the outbreak; yet it did not necessarily follow that legally the corporation was liable. Mr. READ, a ratepayer whose daughter had contracted typhoid fever, brought an action which was treated as a test case. The pleadings presented the claim for damages on three grounds. The first was breach of contract for the sale of goods (or the rendering of services) with the warranty imported by Section 14 of the Sale of Goods Act, 1893—namely, that goods shall be reasonably fit for the purpose for which the seller knows the buyer to require them. The second ground was breach of statutory duty. The third was ordinary common-law negligence. Mr. Justice STABLE dealt with these as follows. In the first place he found no contract. The corporation was bound to supply water; Mr. Read was entitled to receive it; their relationship was not contractual; it was the creation of statute. As to the second ground (breach of statutory duty) Section 53 of the Waterworks Clauses Act, 1847, entitled every owner and occupier of a dwelling-house to have water for domestic purposes. Mr. Read was in that category, though his daughter was not. The corporation owed him a duty though it owed none to her. The judge found that the corporation had not performed its statutory duty. There arose, however, a further legal point on both the second and third grounds of claim. The Act prescribes a penalty for breach of its provisions. Did this mean that the fine imposed under the Act was the exclusive remedy? Did it preclude the bringing of an action for damages? There is no doubt that for breaches of some of the statutory obligations in the Waterworks Supply Act the penalty is an exclusive remedy. But in this case the judge refused to say that its existence negatived the right to claim damages. The consequences of such a decision, he declared, would be startling. The corporation had the statutory duty to supply the householder with water for domestic purposes. That must include water for his family's consumption. Miss Read had suffered from a dangerous illness as the direct result of the failure of the corporation to exercise due care and skill. It would be an extraordinary result if she were to be deprived of her remedy at common law because of the existence of a statute which imposed a duty, but not a duty to her, and set up a remedy for breach of that duty of which she could never take advantage. On the third ground, therefore, the court awarded Miss Read £100 damages. There was, wholly independent of the statute, a common-law obligation brought into existence by what the corporation had done or left undone. Her father was awarded agreed out-of-pocket expenses and judgment was entered against the corporation with costs. Appeal is not unlikely.

By its ready admission of facts the corporation greatly shortened the case. The judge said it was conclusively proved that the epidemic was caused either by an infection brought into the water by a carrier while work was going on in the Addington well in October, 1937, or from some unidentified and probably transitory condition in the gathering ground. He found that criticisms against the responsible officials of the corporation for the sanitary arrangements made for the workmen at the well were not substantiated. Nor were the criticisms made good which were directed to the absence of a medical examination of the workmen, the method of their selection, or the supervision of them while at work. Due care and skill had been taken in this, and the officials had behaved in a conscientious, responsible, and trustworthy manner in the discharge of those duties. The corporation failed in two major matters. The use of the chlorinating plant was haphazard, ill-considered, and inadequate. At the moment of greatest peril, when the water was being put into supply while the men were working in the well, the customary precautions of filtering and chlorination were inexcusably omitted. The corporation's responsibility rested on its water committee. Entrusted with the general superintendence of this important public service, the committee had no considered policy on chlorination. There was no evidence that any committeeman had made any inquiry or taken any step to formulate a policy, or set up machinery for carrying out any such policy, or provided for regular and efficient supervision in that respect. Apart from this comment on the committee's omissions, the judgment has many reassuring aspects. The corporation has, since the epidemic, adopted in full all recommendations. Its officers are declared to have put the public safety in front of their own private interests and to have subordinated every private interest to the paramount necessity of finding out the truth. Mr. Justice STABLE said he had no doubt that the corporation's action had more than restored any loss of confidence which the public might have felt. It is pleasant to add that, during the conduct of the case, the medical officer of health was praised on all sides for his fearless devotion to duty and his energetic measures to control the outbreak.

THE USES OF MALE HORMONE

BROWN-SÉQUARD in 1889 reported enthusiastically on the benefit he had obtained from hypodermic injections of an aqueous extract of testicular juices and blood from the spermatic vein. His observations are now discredited because of the negligible androgenic content of his extracts; but they serve nevertheless as a useful introduction to the study of male hormone therapy. His method of treating male senility had a reasonable basis, but his records demonstrate the influence of suggestion on a condition in which symptomatic response is the only criterion of progress.

To-day, fifty years after these classical observations, the administration of male sex hormone has been put on a scientific footing. Thanks to the chemist, a synthetic preparation of testosterone, the active principle of the testis, is available in such a form that it retains activity for some days after intramuscular injection or can be given effectively in tinctures or unguents applied to the skin. With so powerful an agent in our hands it is important that the indications for its use should be critically considered. As a substitute for the natural secretion of the testis testosterone has been proved wholly effective: it can restore to the male castrate the power of erection and the ability satisfactorily to perform coitus, and in eunuchoidism it can complete the arrested development of the male secondary sexual characters. Definite deficiencies of this kind, however, are rare in comparison with conditions in which there are subjective symptoms rather than objective signs. Impotence and a feeling of diminishing virility are complaints for which every practitioner is consulted frequently. Owing to the absence of objective criteria it is hard to assess the clinical efficacy of male hormones, and if sterile olive oil is occasionally substituted for testosterone it will often be found that the response is the same. It is one of the features of such substitution therapy that relatively large quantities of hormone are required to bring about changes in animals or patients that are not deficient in the secretion, and it is therefore necessary to administer very high doses to produce anything more than a "psychological" effect in cases where objective evidence of deficiency is lacking. The same caution should be used in interpreting the results of androgenic therapy in cases of prostatic enlargement. Prostatic symptoms vary so much from time to time that it is unwise to express any opinion on the effectiveness of hormone treatment until a large number of patients have been observed over a period of years. It has been shown that frequency of micturition, and even the amount of residual urine, may diminish after injections of sterile olive oil.

Apart from their substitutive action androgens are now employed to antagonise œstrogens and to inhibit pituitary activity. This has led to their use on female patients. Given in large doses they arrest the menstrual cycle and cause amenorrhœa of variable duration, and their administration has accordingly been advocated in cases of metropathia due to unopposed œstrogenic activity. The effect of testosterone on chronic "mastitis" is also being investigated. The changes in the breast tissue in some of these cases suggest excessive œstrogenic activity and large doses of male hormone may reverse such changes. It appears, however, that in both these conditions really big doses are needed to give the desired benefit, and temporary masculinisation, as shown by deepening of the voice, growth of hair on the chin, and enlargement of the clitoris, is sometimes an unwelcome accompaniment.

The essential fact, however, is that androgenic therapy has now been made capable of achieving objective results. The new and potent preparations of the hormone need to be used shrewdly and with caution, but they offer great opportunities.

ANNOTATIONS

CRIME IN 1937

PUBLICATION of the Criminal Statistics for 1937 (Cmd. 5878, H.M. Stationery Office, 3*s.* 6*d.*) follows closely on that of the Prison Commissioners' report for the same period [1] and covers part of the same ground. Again we see proof of the comparative innocence of the feminine sex. The population of England and Wales comprises roughly 17 million males and 19 million females; the females account for only one-eighth of the offences. Another striking fact is that we do grow better as we grow older. There is an adult population of 28 millions and a juvenile population (from the age of 8 to that of 21) of less than 9 millions; the juveniles account for more than half the crimes. Thirteen is the naughtiest age; it is twice as lawless as 19, while 19 is twice as lawless as 30. Of every thousand boys aged 13 there were 13·5 found guilty. For those of 14 and 15 the percentage drops to 11; for those of 16 it is 10, for 17 and 18 it is 8, and for 19 it is less than 7. Among girls the worst group is that which contains persons aged from 15 to 18. The primary motive, we are told by the report, is often a desire for adventure and excitement, or on the part of girls for personal display. If offences of all kinds are examined, one finds that traffic offences amount to 60 per cent. The total of persons found guilty in 1937 of any kind of offence was 805,336. Over 99 per cent. of these were dealt with by the magistrates; less than 1 per cent. went before a jury. The murder figures, always curiously stable, have dropped. It is significant that, out of 48 persons arrested for murder, 13 were found insane on arraignment, 11 were found "guilty but insane," and 2 were certified and sent to Broadmoor after sentence. It is a heavy price to pay for the failure to diagnose and deal with mental ill health.

The cost to the community in human life and safety can be appreciated by the statistics of criminal lunatics confined at the end of last year—439 whose offence was murder, not to mention such figures as 144 of attempted murder, 114 of felonious or malicious wounding, and 27 of sexual offences, including 5 cases of rape. The report contains the usual

[1] See *Lancet*, Nov. 26th, p. 1252.

particulars concerning coroners, the deaths reported, inquests, and post-mortem examinations. One sometimes hears it said that coroners still do not make enough use of their power under the 1926 Act to obtain the report of a pathologist which will often show an inquest to be unnecessary. It is instructive to notice that the total number of post-mortem examinations in inquest cases is very nearly the same as the total number in non-inquest cases. But the local variations are remarkable. Why is the figure for inquest cases at Plymouth 40 against 156 for non-inquest cases, when the corresponding figures for Bristol are respectively 398 and 43? Why, if the non-inquest post mortems at Swansea are as high as 100 against 89 for inquest cases, is the proportion reversed at Cardiff where there are 103 autopsies in inquest cases and only 5 in non-inquest cases?

Surgeon and physician are sometimes charged with negligence in their professional work with the possible result that heavy damages are awarded against them. The issue of the year's Criminal Statistics affords a chance to see how our criminal tribunals, against whom no damages can be given if they make mistakes, have stood the test of the process of appeal. Many applications for leave to appeal (against either conviction or sentence, or both) are sifted by the Court of Criminal Appeal. Roughly 8 applications out of every 11 are refused, 2 are abandoned, and 1 is allowed to proceed. Out of the 56 appeals actually heard by the appellate tribunal the conviction was quashed in 10 cases, the sentence was quashed in 1 case, and in 20 cases the sentence was quashed and some other sentence substituted. The figures of successful appeals from the police-courts to quarter sessions are of course much higher. Substitution of a different sentence on appeal is no great matter; punishment is not standardised and each case will seem different to a different bench. When a conviction needs to be set aside, it is more serious; but those of us who feel confidence in the administration of the English criminal law can study these criminal statistics without grave anxiety.

TREATMENT OF PARATHYROID TETANY

THE substances most widely used for the treatment of parathyroid tetany have been parathyroid hormone and vitamin D in large doses. The way in which these two substances work is widely different: the action of Parathormone is primarily to cause increased loss of phosphate through the kidneys, the rise of the serum calcium being a secondary effect due to the mobilisation of calcium from the bones; vitamin D, on the other hand, increases the net absorption of calcium from the gut, and its influence on phosphate metabolism is secondary to this increase.

Dihydrotachysterol (also known as A.T. 10), which is derived from another irradiation product of ergosterol, has also been used, particularly in Germany, since the observations of Holtz in 1933. In this country its employment in isolated cases has been recorded by Snapper[1] and by Elliott,[2] and in the United States a series of 7 cases has been studied by MacBryde.[3] Until recently, however, there were no adequate metabolic data on this substance: it was known not to be antirachitic, although it affected calcium metabolism. Metabolic studies by Albright and his colleagues[4] have now shed light on its behaviour. These workers studied the effects of vitamin D and of A.T. 10 on three patients with idiopathic hypoparathyroidism, and also the effect of parathormone on one of them. Vitamin D and A.T. 10 appear to have the same fundamental actions of increasing both fæcal calcium absorption and urinary phosphate excretion, but the ratio of the latter effect to the former was much greater with A.T. 10 than with vitamin D. Parathormone seemed to have no primary effect on calcium absorption from the gut, but substantially increased urinary phosphate excretion. The action of A.T. 10 therefore resembled closely that of parathormone and it was found to be a most efficacious agent in the treatment of parathyroid tetany. The fascinating suggestion is made that by extending the difference between vitamin D and A.T. 10 it might be possible to synthesise a substance with the same biological properties as parathyroid hormone, if not the hormone itself. It does not, however, seem very probable—from what little is known of its chemistry—that parathyroid hormone will turn out to be a sterol derivative.

[1] Snapper, I., *Lancet*, 1934, **1**, 728.
[2] Elliott, T. R., *Ibid*, 1935, **1**, 641.
[3] MacBryde, C. M., *J. Amer. med. Ass.* July 23rd, 1938, p. 304.
[4] Albright, F., and Sulkowitch, H. W., *J. clin. Invest.*, 1938, **17**, 305; Albright, Bloomberg, E., Drake, T., and Sulkowitch, *Ibid*, p. 317.

BLOOD-SUPPLY OF ABNORMAL TISSUES IN THE LUNGS

LAST year R. D. Wright[1] investigated the response of the blood-vessels in the liver to the presence of newly formed tissues which had developed under pathological conditions. He found that whether the new blood-vessels which developed in the new tissue were supplied from the hepatic artery or portal vein was determined not by the proximity of the developing tissue to the field of arborisation of these vessels but by its origin. The hepatic artery gave rise to the new vessels in masses of growing bile-ducts and in carcinomas secondary to tumours developing from tissues in the systemic arterial field, whereas the portal vein became the afferent supply to newly developed masses of liver tissue. It was concluded that the new epithelial tissue was the primarily growing tissue or organiser in the field, and that it had a specific evocating effect on one only of the two available sources of blood-supply. Wright[2] now reports the results of a similar investigation carried out on the lungs—another organ with a double afferent blood-supply. The bronchial arteries, arising from the systemic circulation, supply every tissue of the lungs except that part of the respiratory tract distal to the respiratory bronchioles, in which region there is a functional anastomosis with the pulmonary capillaries and drainage of the bronchial vascular system blood into the pulmonary veins.[3 4]

It is possible to determine the origin of the blood in the various vessels during life by simultaneous injection with coloured gelatin masses of the bronchial arteries—by way of the aorta—and of the pulmonary artery. Wright has used this method with success, as his published colour photographs show, for demonstrating the new blood-supply to a variety of abnormal tissues formed in the lung. He finds that new blood-vessels are not formed in rapidly developing tuberculous granulation tissue of typical follicular structure; rather do the existing vessels appear to be undergoing obliteration. On the other hand, when a growth of collagenous tissue occurs in the lung in association with either a tuberculous lesion or a deposit of silica, new vascular elements form in this tissue which are almost always injected from the bronchial arteries. Furthermore, the blood-vessels

[1] Wright, R. D., *J. Path. Bact.* 1937, **45**, 405.
[2] Wright, *Ibid*, November, 1938, p. 489.
[3] Miller, W. S., The Lung, 1937, Baltimore.
[4] Berry, J. L., and Daly, I. de B., *Proc. Roy. Soc.* B, 1931, **109**, 319.

of the stroma of carcinomas and those which develop in fibrosarcomas growing in the lungs are injected from the bronchial arteries, but actively growing chorionic carcinomas are avascular. From a careful study of the vascular pattern of the lesions Wright concludes that there is a new growth of vessels, injected from the bronchial artery, into tissues which usually have a systemic arterial supply. With regard to the factors which govern new vessel formation he emphasises two findings. In the lung, as in the liver, the systemic capillary vessels are said to be associated with a sheath of collagenous tissue, but the liver sinusoids and pulmonary artery fields have no such association. Also, in lesions where there is a growth of tissue which formed collagen fibres, whether excited by the tubercle bacillus, silica, or carcinoma cells, or occurring as part of autonomous neoplasm (fibrogenic carcinoma), there is a growth of a systemic arterial blood-supply.

The suggestion put forward that the development of new systemic vessels may be closely linked with the excitation of collagenous tissue to further development irrespective of the nature of the causal agent of collagenous proliferation is interesting but obviously demands closer examination. Prof. Wright does not exclude the possibility of other mechanisms being responsible for determining the origin of the new blood-vessels. He raises the question of the influence of pressure exerted by growing cells in causing a redistribution of blood in the region of the lesion, a factor which was recognised by Miller,[3] who observed that the transitional zone from the bronchial to the pulmonary circulation in the bronchial tree is a favourite place for tubercles to develop. Miller, however, was unable to decide whether this was due to a retardation of the circulation at this point or to some other cause.

The importance of histological studies of the bronchial vascular system for the elucidation of intrinsic pulmonary mechanisms has already been noted in our columns,[5] and it is to be hoped that the valuable contribution to our knowledge of lung pathology made by Prof. Wright will give further impetus to investigations of the systemic arterial supply to the lungs both in health and disease.

ACCIDENTAL INFECTION WITH LYMPHOCYTIC CHORIOMENINGITIS

THE list of virus diseases which have infected those who study them is an ever growing one. A few years ago yellow fever ranked easily first in the number of its victims, but highly efficient prophylactic immunisation has removed its terrors. Psittacosis, Rift Valley fever, influenza, lymphogranuloma inguinale, louping-ill, and B virus are still, however, the cause of occasional laboratory infections, and to these must now be added lymphocytic choriomeningitis. During the past few years the virus of this condition has been isolated in the United States, France, and this country, but, although intensive work has been carried on in a number of laboratories, no actual infection has hitherto been recorded among laboratory workers, despite the occasional development of specific immune bodies to the virus. Lépine and Sautter [6] have now reported the accidental infection of one of themselves, the virus being isolated from both the blood and urine. Infection appears to have been contracted while grinding up virulent tissues with powdered glass in a mortar, when a small fragment of glass jumped up and lodged in the conjunctival sac. Although 2 per cent. Argyrol was immediately applied, ten days later the patient felt cold, shivery, and tired, and her temperature rose to 39·3° C. The symptoms, which at first were believed to be due to influenza, gradually abated with the exception of asthenia. On the ninth day of the illness the temperature again rose, and the patient developed severe headache, persistent insomnia, stiffness at the back of the neck, nausea, and vomiting. The deep reflexes were exaggerated. She gradually improved and her temperature fell to normal on the twenty-second day of the illness. By this time she had lost more than 9 kg. in weight and some months elapsed before convalescence was complete. On recovery the patient's serum fixed complement with an antigen containing choriomeningitis virus, so that the evidence is conclusive that this was the cause of the illness.

[5] *Lancet*, 1937, **1**, 452

[6] Lépine, P., and Sautter, V., *Ann. Inst. Pasteur*, 1938, **61**, 519.

INTERNAL EAR DEAFNESS

IN opening a discussion held by the section of otology of the Royal Society of Medicine on Dec. 2nd, Mr. F. W. Watkyn-Thomas spoke of the spurious cases of inner-ear deafness that might cause mistakes. In such cases there was loss of high tones by air-conduction (though not by bone), together with an immobile drum and a blocked Eustachian tube, and the deafness could be relieved by removing the obstruction. He thought that bona-fide focal sepsis should be sought where inner-ear deafness arose in middle age, with an abrupt loss of hearing for high tones. Mr. Stephen Suggit showed characteristic audigrams of inner-ear deafness due to various causes, and Mr. A. F. Rawdon-Smith, Ph.D., read a paper on experimental work. He has found that the electric response obtained from the cochlea of a cat whose eighth nerve has been destroyed is identical with that from the cochlea of a normal cat, and he concludes that it is misleading to consider that the electric response of the cochlea can be taken as an index of hearing in an animal.

THE TOBACCO MOSAIC VIRUS

MUCH work has been done in the last few years on the nucleoprotein transmitting the tobacco mosaic disease. This protein has been isolated as needles [1] or "paracrystals" which, according to the results of X ray analysis, consist of long protein molecules packed with a two-dimensional regularity and with a molecular weight of 10–17 million.[2 3] In solution it shows a characteristic anisotropy of flow, and when concentrated it spontaneously forms a bi-refringent gel.[4] There is no evidence that the virus activity can be dissociated from the protein; the activity accompanies it throughout the stages of purification, and any treatment which denatures or materially changes the protein at the same time destroys the virus activity. Comparatively slight changes in the protein molecule, such as those produced by formaldehyde or by nitrous acid, inactivate the material. On the other hand, they do not destroy its serological properties,[5] and it has been shown that preparations inactivated by formaldehyde can be reactivated, and that the activity of the preparations runs parallel to the presence of free amino groups in the protein.[6]

[1] Stanley, W. M., *Science*, 1935, **81**, 644; *Phylopathology*, 1936, **26**, 305; and *J. biol. Chem.* 1936, **115**, 673.

[2] Bawden, F. C., Pirie, N. W., Bernal, J. D., and Fankuchen, I., *Nature, Lond.* 1936, **138**, 1051.

[3] Bernal, J. D., and Fankuchen, I., *Ibid*, 1937, **139**, 923.

[4] Bawden, F. C., and Pirie, N. W., *Proc. roy. Soc.* B, 1937, **123**, 274–320.

[5] Stanley, W. M., *Science*, 1936, **83**, 626.

[6] Ross, A. F., and Stanley, W. M., *Proc. Soc. exp. Biol. Med., N.Y.* 1938, **38**, 260.

Controversy has arisen, however, over the state of the virus in the plant. It has been recognised that prolonged purification produces an aggregation of the virus units and brings about a reduction in the specific activity and in the filtrability, accompanied by an increase in the anisotropy of flow. Loring, Lauffer, and Stanley [7] now claim that high-speed centrifugation in the absence of salt gives preparations that are comparable in infectivity and filtrability with the native virus. After one sedimentation the material passed through ultra-filters of average pore-diameter 190 mμ and 330 mμ to the same extent as did the original virus in the sap, and it showed a similar degree of stream double refraction. Twice-sedimented virus filtered slightly less readily, and four sedimentations produced a slight decrease in the specific activity and a significant increase in the stream double refraction. It is therefore thought that a few careful sedimentations give a product which is comparable with the virus in the untreated juice, and that the virus units have a length of at least 430 mμ, an effective diameter of about 12 mμ, and a molecular weight of 43 million. Bawden and Pirie,[8] using rather longer periods of centrifugation, found a significant increase in the stream double refraction, which they attribute to a linear aggregation of the particles. Further, they point out that since the previous authors found a similar change after several centrifugations, it is improbable that one centrifugation would produce no effect. Smith and McClement [9] state that precipitated virus can be obtained with a lower filtration end-point (150–175 mμ) but that even this indicates a considerable degree of aggregation, for the accepted filtration end-point of the virus in unclarified sap is about 50 mμ. Highly purified preparations which show the liquid crystalline state have a much higher filtration end-point and are retained by filters with a pore-diameter of 450 mμ. Therefore the virus probably exists in the crude sap as small protein units, which readily aggregate and can eventually form liquid crystalline structures visible to the naked eye. These larger particles retain the serological properties of the original virus and the greater part of its activity but show an enhanced stream double refraction. Further investigations by Sreenivasaya and Pirie [10] show that virus protein of high molecular weight can be disintegrated by surface-active substances, such as sodium dodecyl sulphate, to give a nucleic acid and an inactive protein of lower molecular weight. They deduce that the units from which the aggregates constituting the purified virus preparations are built up are themselves built up from smaller protein units of normal molecular weight. These conclusions agree with the findings of Bernal and Fankuchen,[3] who said that the virus units show an internal regularity of structure which may be described as crystalline.

In the plant the virus has been found by Martin and McKinney [11] to be concentrated in the cytoplasm of the leaf, the vacuolar fluid being almost inactive. This confirms the earlier work of Livingstone and Duggar,[12] but Martin and McKinney have also found that the total protein of the cytoplasmic extract corresponds closely in specific activity with purified paracrystalline preparations of the virus, and it appears to consist largely of virus protein. It is not yet clear, however, whether the cytoplasmic protein in the extracts can be assumed to be wholly virus, for the results described above suggest that the activity of the preparation used as a control would be probably diminished during its purification. The experiments of Martin and McKinney furnish additional evidence for the theory that the virus can be transmitted through the plant by the plasmodesmata linking the cytoplasm of adjacent cells, as originally suggested by Livingstone,[13] and that this can supplement the transport through the vascular system.

[7] Loring, H. S., Lauffer, M. A., and Stanley, W. M., *Nature*, 1938, **142**, 841.
[8] Bawden, F. C., and Pirie, N. W., *Ibid*, p. 842.
[9] Smith, K. M., and McClement, W. D., *Ibid*, p. 843.
[10] Sreenivasaya, M., and Pirie, N. W., *Biochem. J.* 1938, p. 1707.
[11] Martin, L. F., and McKinney, H. H., *Science*, Nov. 11th, 1938, p. 458.
[12] Livingstone, L. G., and Duggar, B. M., *Biol. Bull.* 1934, **67**, 504.
[13] Livingstone, *Amer. J. Bot.* 1935, **22**, 75.

RADIUM BEAM THERAPY

THE Government's proposal to put funds at the disposal of the Radium Commission for the purchase of further supplies of radium adds to the importance of the report on radium beam therapy just issued by the Medical Research Council.[14] The results of the investigation carried out on the Council's behalf are likely to influence the whole future of radiation therapy in this country. The investigation has been limited to a type of tumour which is easily accessible to direct examination and in which surgery is very difficult, a group which includes cancer of the mouth, pharynx, and larynx. The apparatus used is a modification of the unit designed by Sievert of Stockholm, which secures the maximum of protection for patient and staff. The investigators' main difficulties were the lack of a standard unit of dosage and of a method of directing the radiation accurately, and the problem of estimating the radiation received in the tissues at the site of the disease and the total radiation received by the body. These have largely been overcome. The unit of dosage accepted is the röntgen; the beam is directed by a directional calliper; the radiation received in the tissues can be calculated from specially prepared charts; finally total radiation is estimated by means of an ingenious "electrical condenser in the form of a man." The general effects of radiation can also be judged from regular blood counts, the most important effect being a diminution in the total lymphocytes.

The results are tabulated according to the site and degree of the disease. No mention is made of whether lymph glands are involved, an omission which makes comparison with other published figures difficult. Of the 366 cases treated from 1934 to 1937, 44 died of intercurrent disease, and, if the statistical requirements of the Radium Commission are accepted, must be removed from the sample. This leaves 322 cases, only 34 of which were operable. Of these 122, or 37·8 per cent., were alive and symptom-free in January, 1938. Of the cases treated in 1934, excluding non-statistical cases, 32 per cent. were alive and symptom-free after three years—a very satisfactory result for the type of case under consideration. The curability rate for cancer of the tongue, floor of the mouth, alveolus, and palate is similar to that obtained by other methods, but cancer of the tonsil, pharynx, larynx, and postcricoid region show a decided balance in favour of beam therapy. No less than 102 cases of cancer of the pharynx were treated and 33 were afterwards symptom-free. Only one of these was treated in 1934 and three in 1935, but few clinics can produce any cases of cancer of the pharynx alive after three years. It is in the

[14] Report on Radium Beam Therapy Research, 1934–1938. By Constance A. P. Wood, L. G. Grimmett, T. A. Green, and others. *Spec. Rep. Ser. med. Res. Coun., Lond.* No. 231. H.M. Stationery Office. 1938. Pp. 77. 4s.

treatment of the cervical lymph nodes that other methods have proved of little value in inoperable cases, and it is encouraging to read of seven cases where palpable gland masses or infiltrations have disappeared and the patients were symptom-free after eighteen months to three years.

The report does not suggest that beam therapy is the only method of treating cancer in the mouth or throat with radium. The technique is difficult and time-consuming and must be dangerous in unskilled hands. The conclusion can, however, be drawn that, although this form of therapy should be restricted to special centres, it offers a chance of cure in forms of advanced cancer which have hitherto resisted all efforts at control.

THE MEDICAL DIRECTORY, 1939

THIS invaluable year book reached us before the beginning of December. There are four fewer pages of text than last year (a boon which we owe to the steady encroachment of new and better type), and apart from the innumerable corrections required to bring it up to date the book is substantially unchanged. Increasing pains have evidently been taken to supply doctors with what they should know about hospitals, but, if a criticism may be permitted, it is rather disappointing to find so little mention of municipal and public assistance hospitals outside London, which may now be the largest and best equipped hospitals in their area. An appreciation of the total hospital accommodation in an area is a matter of importance to every practitioner, and a complete list would, we feel sure, be a welcome item in a later edition. The space for it could perhaps be saved by the omission of a limited list of practitioners of massage and medical gymnastics on pp. lvi to lx. All members of the Chartered Society have pledged themselves not to advertise individually, and on request the Society supplies a complete classified list of its members. This is the ninety-fifth annual issue of the Directory and it may be had from Messrs. J. and A. Churchill for 42*s*.

LEAD IN FOOD

WORK undertaken at the Government laboratory for the Ministry of Health departmental committee on ethyl petrol in 1930 showed that the presence of lead in human urine was almost universal. The amount excreted via the kidneys is small, on an average about 0·05 mg. per day, but it indicates at least an equivalent intake. The obvious sources of this lead are dust and vapours in the air, and food and water. Lead reaching the kidneys from the lungs will have entered the systemic circulation and have had a chance of being distributed in the organs of the body. Opinions differ as to the proportion of lead in the blood of normal persons, but it is certainly less than 1 part per million, and there is reason for considering a proportion of over 0·3 part per million as indicating incipient lead poisoning. The bones contain more lead than any other tissue, and according to Roche Lynch, Slater, and Osler a man in normal health may have 100 parts of lead per million in his skeleton, equal to about 1·5 grammes in all. The bones appear to store the excess of lead received from the blood and may possibly liberate it under exceptional conditions. Some of the lead entering the alimentary tract is absorbed into the blood and leaves the body via the kidneys; some no doubt is stored. Much of it passes out in the fæces, but whether after absorption and excretion in the bile or merely as unabsorbed lead is not clear. Lead in water was the subject of a paper by H. Ingleson issued by the Water Pollution Research Board this year, and the Ministry of Health has now published a report[1] on lead in food by Dr. G. W. Monier-Williams. No fresh or canned fruit was found to contain as much as 1 part per million of lead, although peaches contained 0·9 and bananas 0·6 part. Imported canned peas, drained from liquid, contained no lead, whilst the home product contained 0·8 part, dried peas 1·1 parts, and fresh green peas 0·2 part. Of cereals, self-raising flour contained 2·4 parts, doubtless mainly from the baking powder. Milk foods were mostly free from lead. Fish gave variable results, and it seems probable that the 8·3 parts in sardine paste and 5·1 parts in slids in aluminium containers came from the cooking utensils. Of other articles, curry powder may contain much lead because lead chromate is used to improve the colour of turmeric root. Monier-Williams estimates the daily intake of lead by an average individual as 0·5 mg. He concludes "that no general limit for lead applicable to all foods would be satisfactory. The presence of lead in any particular food must be regarded, not only as a danger in itself, but as a contribution, more or less serious, to the total daily intake of lead from all sources. The aim should be to reduce the total amount of lead ingested in the diet to the lowest possible amount, and to this end every endeavour should be made to ensure that individual foods are prepared in such a way as to eliminate lead contamination as far as possible."

ANTIVIVISECTION REBUFFED

IN several of the United States of America the people have a constitutional right to vote directly on legislative measures which they may have initiated themselves or which have already been passed by the legislature. However beneficial this right may be in theory, it has lately become a source of embarrassment through being exploited by small groups to further their own interests or beliefs.[2] Thus in Colorado a group of chiropractors sponsored a measure which would have removed the monopoly of orthodox medicine in State-required examinations, insurance practice, and tax-aided institutions. In California the antivivisectionists last month put forward a measure to make it difficult, if not impossible, to procure animals for experimental purposes. Both of these proposals were actively opposed by the State medical associations, aided by other professional organisations and laymen, and both were rejected by large majorities. To ensure that the voters understood the true state of affairs entailed a considerable expenditure of time and money, but it is useful to have an occasional demonstration that all the people cannot be fooled all the time.

[1] Lead in Food. By G. W. Monier-Williams, O.B.E., Ph.D., *Rep. publ. Hlth med. Subj., Lond.* No. 88. 1938. H.M. Stationery Office. 1*s*.

[2] *J. Amer. med. Ass.* Nov. 5th, p. 1769, and Nov. 19th, p. 1938.

CONGRESS FOR LIFE-SAVING.—The fifth International Congress for Life-saving and First Aid to the Injured will be held at Zürich and St. Moritz from July 23rd to 28th under the presidency of Dr. D. H. Schaer. The work of the congress will be divided into the following sections: international aid in major catastrophes; rescue work and first aid in catastrophic events and international traffic; first aid to the injured in general; organisation of first aid; rescue work and first aid; first aid on the coast and inland waters; first aid at sporting events; and history and idea of life-saving and first aid. Further information may be had from the secretariat of the congress, Schmelzbergstrasse, 4, Zürich.

SPECIAL ARTICLES

UNITED STATES OF AMERICA

(FROM OUR OWN CORRESPONDENT)

FERTILITY AND STERILITY

THE American Philosophical Society on Nov. 18th welcomed as guests in its hall on Independence-square, Philadelphia, the Population Association of America. This joint meeting of the oldest scientific body on this continent with the youthful society of population experts was in every respect successful. Prof. Lowell J. Reed presided over the morning session which considered the intrinsic and environmental factors in population growth. Dr. Frank W. Notestein of the Princeton University school of public affairs pointed out that neither the present dramatic reductions in death-rate, nor the present favourable (for fertility) age composition of the population can be expected to continue. Contraception has been shown to be an effective method of birth-restriction but it is not necessarily the fundamental cause. Other speakers attempted to throw light on the ultimate causes of declining birth-rates. Dr. Warren S. Thompson, director of the Scripps Foundation, Miami University, examined changes in what he called "the climate of opinion" and quoted without endorsing the Nazi view that more than a million German births have been added since 1933 by restoration of the public faith in the future of Germany. He reviewed the disparity of reproduction in different areas of this country where the replacement index is 1·69 for farms but only 0·76 for towns over 100,000 population. Among American women 30 per cent. have no children, 18 per cent. have only one child, and 18 per cent. only two children. We may be content to see our population stabilised or even grow smaller but a decline since 1930 of the birth-rate in our larger cities by one-fourth cannot be regarded with equanimity. In many sections of this country children are simply not among the more important values of life. An original technique for estimating the "values" esteemed by married couples was presented by John C. Flanagan, instructor in Teachers College, Columbia University. This consisted in a statistical analysis of questionnaires filled out by 700 men and women, a homogeneous group, each couple replying to some 2500 questions. The study was made under the auspices of the Pioneer Fund. The size of family was planned by 45 per cent. of these couples shortly after marriage. The average family desired by this professional group is 3·2 children. Those more recently married more often plan and the actual size of their families approaches more closely to the desired size. Yet even in this younger group 24 per cent. of pregnancies have been accidental. Clyde V. Kiser of the technical staff of the Milbank Memorial Fund reported a study made with the collaboration of the Committee on Maternal Health into the degree to which sterility is involuntary. He found that more than three-quarters (78 per cent.) of women "never pregnant" had taken no steps (nor had their husbands) to prevent pregnancy; indeed 57 per cent. of them had actually consulted a physician on account of their sterility. Mortimer Spiegelman of the Metropolitan Life Insurance Company provided a small measure of comfort by describing the postponement of widowhood and the reduction in its rate and in the rate of broken families—all factors which tend to oppose the trend of declining births.

The afternoon session was devoted to speculative discussions of future trends and the evening to a thoroughly philosophical address by Dr. Alfred J. Lotka, the president of the Population Association. All the papers are to be published in a forthcoming issue of the *Proceedings of the American Philosophical Society*.

EQUINE ENCEPHALOMYELITIS

A report on the recent outbreak of human cases of equine encephalomyelitis in New England [1] was made to the American Public Health Association at Kansas City on Oct. 26th. Dr. Roy F. Feemster said that when he left Massachusetts the virus had been recovered from 7 patients and that some 30 additional cases were under investigation. Of the total known or suspected cases, over a third are in children under 2 and over two-thirds in children under 10. One proven case is in a man of 55. The onset in children is sudden and in adults more prolonged. Characteristic symptoms are fever (102° to 105° F.), irritability or drowsiness, headache, and convulsions. There is leucocytosis (14,000–65,000; 75–90 per cent. polymorphs). The spinal fluid, which is under pressure, contains from 200 to 2000 cells, 60–90 per cent. being polymorphs. Fatal cases lapse into coma and do not recover consciousness. Of the 38 cases suspected and proved 25 have already been fatal.

The pathology is characteristic. There is a severe, diffuse acute meningo-encephalitis, the perivascular spaces and to a less degree the meninges being infiltrated by polymorphonuclear and mononuclear cells. The destruction of nerve-cells is widespread. Thrombi are found in the small spaces of the brain. A method of laboratory diagnosis for this disease before death is badly needed, the only proof available at the present time being cultures from brain tissue. Experimentally both the mosquito and the tick can convey the infection. The natural vector is unknown.

The chairman, Prof. J. A. Doull, reminded the audience that equine encephalomyelitis had first been described by Dr. Karl Meyer of the Hooper Foundation in 1930 and called upon him to open the discussion. Dr. Meyer said that in retrospect there could be no doubt that there had previously been human cases in California. He believes that there is a host in nature from which both the human and horse cases are derived. Subclinical infection occurs in horses as is shown by the development of immunity. As in poliomyelitis, animals can be infected by spraying the nasal mucous membrane, but he hoped that no attempts to control the spread of infection by nasal sprays might be made as had been done for poliomyelitis.

Prof. John E. Gordon of Harvard added the information that no multiple cases have been found in families. No case has definitely been traced to human contact nor has any intimate contact of a case with horses been established. The mouse has proved highly susceptible to the virus, and Dr. Fothergill has recovered it from the brain of a sick pigeon.

THE STILLBIRTH HABIT

In a paper read by Dr. Elizabeth M. Gardiner and Mr. J. Yerushalmy, Ph.D., to the sixty-seventh annual meeting of the American Public Health Association, convincing evidence is adduced of a familial tendency

[1] See *Lancet*, Oct. 29th, 1938, pp. 1007 and 1020.

towards loss of the products of conception through stillbirths and neonatal mortality. Statistical study of the birth and death certificates of New York State shows that neonatal mortality and stillbirth rates of the offspring of mothers who have had previously one or more infant losses is more than twice that of infants born to mothers who have previously had no such loss. The force of mortality, as may be seen from the accompanying Table, is found to increase directly in proportion to the number of previous infant losses. Premature birth is also found to be more frequent among mothers with a history of infant losses. This increased frequency of premature birth does not, however, explain the whole of excess mortality in the offspring of this group of mothers. From these observations the authors draw two conclusions: (1) that extensive studies are needed into the causation of pregnancy loss in this group of especially susceptible mothers, and (2) that, so long as adequate prenatal care cannot be provided indiscriminately for all expectant mothers, those who have had a history of previous infant loss should be selected for particular attention.

STILLBIRTHS, NEONATAL MORTALITY, AND COMBINED LOSS (LATE FŒTAL AND NEONATAL MORTALITY) ACCORDING TO THE NUMBER OF PREVIOUS LOSSES TO THE MOTHER, SECOND BIRTHS AND OVER, NEW YORK STATE (EXCLUSIVE OF NEW YORK CITY), 1936

Previous losses.	Live births.	Still-births.	Neo-natal deaths.	Rates.		
				Still-birth.*	Neonatal mor-tality.†	Com-bined loss.*
0	39,929	756	984	18·6	24·6	42·8
1	9,025	383	326	40·7	40·1	79·2
2	2,175	142	142	61·3	65·3	122·6
3	648	61	50	86·0	77·2	156·6
4 & over	483	51	50	95·5	103·5	189·1
Total	52,260	1,393	1,588	26·0	30·4	55·6

* Stillbirth and combined loss rates per 1000 total births (including stillbirths).
† Neonatal mortality-rates per 1000 live births.

VITAL STATISTICS OF SCOTLAND IN 1937

THE report[1] furnishes evidence of recent tendencies affecting population growth. The population of Scotland as estimated at the middle of 1937 was 4,976,600, an increase since the census of 1931 of about 133,600 persons. This is in striking contrast to the previous intercensal period (1921–31) when the population diminished on account of a large emigration, chiefly overseas. One result of the economic depression that began about 1930 was a reversal in Scotland as in England of the flow of overseas migration. In 1931 and 1932 the net immigration into Scotland was no less than 10,000 per annum. With economic recovery the inward flow diminished, and now amounts to little more than 2000 per annum. On the other hand, there is evidence that unrecorded emigration to England has increased, and though in 1937 the excess of births over deaths was 18,868, it is estimated that the population during the year increased by only about 10,300. The Scottish immigrants have contributed to the peopling of England; in fact, if it had not been for a considerable immigration since 1931 from the Dominions, the Irish Free State, and Scotland, the population of England and Wales would probably have already begun to diminish.

[1] Eighty-third annual report (1937) of the Registrar-General for Scotland. Edinburgh: H.M. Stat. Office. Pp. 137. 4s.

BIRTHS

The Scottish birth-rate in 1937 was 17·65 per 1000 total population, rather less than half the maximum which was reached, as in England, in 1876. The lowest rate recorded for Scotland was 17·62 in 1933. There has since been a slight rise, due doubtless to the considerable increase in the number of marriages during the past four years. The marriage-rate since 1933 has been so high that it is remarkable that the birth-rate has not reached a higher level; it seems that the fertility of marriages has continued to decline. Calculated on the total population the birth-rate is higher in the large towns than in the rural areas, but when fertility is measured according to the number of births per 1000 women aged 15 to 44 years (the general fertility-rate) the position is reversed—the rural areas show a higher fertility than the large towns. The 1937 birth-rate (17·6), though much lower than the rates in the early years of the century, is higher than the rate of England and Wales (14·9) and those of Sweden (14·3) and Austria (12·8), the two countries with the lowest birth-rates in Europe. The illegitimate births numbered 5404, and constituted 6·2 per cent. of the total births. This is the lowest proportion of illegitimate to total births ever recorded in Scotland.

DEATHS

The death-rate in 1937 was 13·85 per 1000 population, and was 0·41 above that of 1936 and 0·60 above the average of the previous five years. The maximum recorded death-rate was that of 1864—viz., 23·58. A steady downward trend then began, and the minimum (12·92) was reached in 1934. Since that year the rate has increased, and in 1937 it was higher than in any year since 1929. The arrest of the downward trend is attributed largely to the gradual ageing of the population, which when enumerated in 1921 and in 1931 was found to be older on the average by nearly two years than at the preceding census, and the increase in the proportion of elderly persons seems to be continuing. Male mortality was higher than female at each age-period. Infantile mortality was 80 per 1000 births, the corresponding figure in England and Wales being 58. Maternal mortality was 4·8 per 1000 births as against 5·6 in 1936 and 6·3 in 1935; the chief cause of the mortality was puerperal sepsis.

The ageing of the population was reflected in the causes of death. Heart disease was numerically the most important; the number of deaths attributed to this cause was 14,360, forming 20·8 per cent. of the total. Malignant tumours, cerebral hæmorrhage, pneumonia, and tuberculosis came next in numerical order, forming respectively 11·3, 9·3, 7·05, and 5·3 per cent. of the total. Deaths from diseases of the circulatory system are still increasing, but the increase is attributed partly to the increasing proportion of elderly persons in the population, and possibly also to changes in certification. The increase in the recorded mortality from malignant disease can be explained almost entirely by the ageing of the population. The relatively high mortality from pneumonia was doubtless due to the exceptional prevalence of influenza during 1937. The death-rate from tuberculosis was 74 per 100,000, the same as in 1936 and 1935, but 3 below the average of the last five years. After 1866–70 the death-rate from

tuberculosis, which in that quinquennium was 382 per 100,000, declined rapidly, but in the past four years there has been little or no change. The increase in the number of deaths from diabetes, which began in 1925, continued in 1937, there being 59 more deaths in that year than in 1936. The increase was less among males than among females, and was chiefly at the later ages.

FERTILITY

In an appendix to the report an account is given of an investigation into the fertility of married women in Scotland, which was based on a 10 per cent. sample of 1931 census schedules, and the results are tabulated together with those of a similar investigation into the census records of 1931 undertaken in England and Wales. From the figures in the accompanying Table it will be seen that at ages under 20 the English fertility-rate was 37 per cent. less than the Scottish. The difference diminishes to 8 per cent. at ages 40–44.

LEGITIMATE BIRTHS IN 1931 PER 1000 MARRIED WOMEN IN EACH AGE-GROUP

Age-groups	Scotland	England and Wales	
		Rate	Percentage of Scottish rate
15–19	588	372	63·2
20–24	386	267	69·1
25–29	257	187	72·8
30–34	166	127	76·5
35–39	107	81	75·5
40–44	36	33	91·9

The data that will be made available by the Population (Statistics) Act, 1938, which came into operation last July, will make it possible to prepare fertility statistics for England and Wales and for Scotland on a much wider basis.

MEDICINE AND THE LAW

Herbalist and Diabetes

AFTER a sharp conflict of evidence Thomas Hugh Wilbraham, a herbalist, was acquitted last week at Manchester assizes on the charge of manslaughter arising out of the death of Eric Gabbott, aged 22, from diabetes. The prosecution opened a strong case against Wilbraham. It was said that he had held himself out as skilled to deal with diabetes and in his treatment had showed himself devoid of the necessary skill, or wanting in the necessary care, with the result that the patient died. Wilbraham, it was alleged, had a system of his own; he did not use insulin when he found his own treatment failing, and, when he saw the young man apparently growing worse, he omitted to prescribe insulin; he told the patient's father that he did not believe in it. Up to March, 1937, the deceased was seemingly in good health. Afterwards his father noticed him drinking quantities of water and becoming drowsy. He consulted a doctor on whose advice the patient was sent to Dr. Norman Kletz. The latter tried a diet for two or three weeks but, finding a considerable increase in the sugar in the body, advised that insulin injections were immediately necessary. Unfortunately, early in May, before the insulin treatment was begun, somebody told the father that insulin was not a cure but a stabiliser; he was given the impression that diabetes could not be cured by a medical practitioner with insulin but could be cured by a herbalist or osteopath. He placed his son under a woman herbalist for treatment but found, from tests which he made himself, that the sugar increased. The father then went to Wilbraham who was alleged to have told him that he specialised in the treatment of diabetes, that he had had successful results with other patients, that he strongly disapproved of insulin, and that his treatment by herbal remedies caused the pancreas to resume its proper functions. He put the patient on a diet consisting as much as possible of green vegetables. Last August the young man broke down; he was weak in the legs and terribly thin. According to the prosecution his father took him to see Wilbraham who said he was very pleased with his condition; he was giving him "pancreatic juices" in his medicine. Later Wilbraham was said to have stated that the sugar was down 1¼ points. In September the young man was too weak to stand. His father telephoned to ask Wilbraham if he should get a doctor. Wilbraham replied that he could do so if he wished but he did not think it necessary. Next day the boy was no better. His father rang up Wilbraham and asked him to come over. He came and said the sugar was less. The father was anxious about coma; Wilbraham said he did not think there was much chance of coma as the sugar was diminishing; he thought the boy was suffering from a poisoned stomach and would give him medicine to put it right. Sometime later the patient went into a coma and was removed to hospital where he died early next morning.

Such was the case opened for the Crown. Among the witnesses called in support of it was the father. Mr. E. G. Hemmerde, K.C., cross-examining for the defence, strongly pressed him to admit that Wilbraham had always said that there was no cure without insulin in the present state of our knowledge. The father emphatically denied the suggestion. "I put it to you," said counsel, "that from first to last he told you that diabetes was incurable without insulin." "No," replied the witness, "he said he could put the boy right with his treatment." In re-examination the father said that two doctors had suggested insulin; he did not take their advice because a friend gave him a paper stating that diabetes could be prevented provided that the patient had not taken too much insulin. The evidence of Dr. Kletz and Dr. W. H. Grace established the fact that if the patient had begun to take insulin in January, he would now be living an active and normal life. There thus seemed to be a cast-iron case for successful prosecution. The defendant, however, contradicted the father's evidence and put an entirely different complexion upon the case. So far from admitting that he advised against insulin treatment or that he did not personally hold with it, he praised insulin treatment and said that he had strongly pressed it. It was, he stoutly maintained, the father who was against insulin. He himself had found insulin combined with his own treatment definitely helpful in some instances and definitely essential in others. He asked his diabetic patients to get insulin prescribed by a doctor. He said he told both the father and the son in August that the son must have insulin; the son said he didn't want it; the father said he couldn't have it. He had told them that a doctor must be called right away. He agreed that the patient's death was accelerated by the failure to give insulin treatment. In his summing-up the judge warned the jury that they were not trying whether treatment by registered medical practitioners was either better or worse than treatment by herbalists. The jury after a short retirement found the accused not guilty.

There were two noteworthy points of general interest in the proceedings. Mr. Hemmerde, always a strenuous advocate for the defence, insisted that there was no question of want of skill in Wilbraham's case inasmuch as Wilbraham was prevented by law from administering insulin. The charge against him must therefore be limited to the failure to advise it—an issue on which, as we have seen, there was contradictory evidence. Wilbraham in the witness-box mentioned the legal restriction. Prosecuting counsel, if correctly reported, seems to have said that the point was one of which he was previously unaware. The judge mentioned the restriction to the jury and observed that it had not been challenged. The authority for the statement is not quite clear. Insulin is not a dangerous drug though it is a "Part I poison" and therefore, to protect the public, an authorised seller may see fit to impose limitations on its supply to unqualified men. Neither the injection nor the purchase of insulin is the exclusive prerogative of the registered medical practitioner.

The second point was one which affects coroners. Wilbraham stood committed for trial on the warrant of the East Cheshire coroner. Mr. Hemmerde found occasion to protest against the deportment of the expert medical witnesses sitting in court. They smiled, he said, when questions were asked which seemed to them ridiculous. In addition he complained that he was embarrassed by the attitude adopted by the coroner. There was a brief discussion with the judge who spoke of the coroner being in the same position as a committing magistrate and expressed doubts whether it would be proper for a committing magistrate to be present when a case which he had committed was being tried. "I think it would be better," concluded the judge, "if the coroner did not take any active part in the case and sat away; I did not appreciate he was in court." The coroner thereupon gathered up his papers and took his departure. It is not quite clear why a coroner from whose custody the depositions come and who is available to prove them must keep away from an assize court, though it may well be that, having acted in a judicial capacity, he should not be actively engaged on the side of the prosecution. These are matters in which our procedure has gradually changed. A century or more ago, before the functions of the police were evolved, the magistrate took a personal part in investigating an alleged crime and in bringing offenders to justice.

Compensation for Death after Mosquito Bite

A crew of 24 sailed from South Shields to a mosquito-infested river in West Africa in 1936. Seven lost their lives and six went to hospital. The county court judge held that one of the dead men, John Craig, died from yellow fever and malaria caused by a mosquito bite. The mother's application under the Workmen's Compensation Act was dismissed on the ground that the injury did not "arise out of his employment." The Court of Appeal has reversed the decision and has awarded £180. Lord Justice Slesser said that, if the locality was one where danger might reasonably arise, it was a risk incidental to the man's employment.

A somewhat similar case was decided in favour of the seaman in Robinson *v.* British and Continental Steamship Co. (see *Lancet*, 1926, **1**, 471). The man was bitten by a mosquito at Ghent while the vessel was unloading near marshy land. The heat and light of the boiler-house attracted the mosquitoes; Robinson was more exposed to a bite than if he had been on shore and had less chance of avoiding it than if he had not been at work. The result was different in Craske *v.* Wigan (1907) and Amys *v.* Barton (1912). The former case was that of a lady's maid who sat at an open window one evening. A cockchafer flew into her face and in brushing it away she hurt her eye. Her claim failed; she was sewing at the time and to that extent was employed at her work, but it was not a risk that arose out of her employment. Amys *v.* Barton was a case of a wasp-sting causing death. This too was unsuccessful; the risk was not specially associated with the work. On the other hand in Rowland *v.* Wright (1908), where a stableman was bitten by the stable cat, his application for compensation succeeded. He had to be in the stables where the cat lived.

PARIS

(FROM OUR OWN CORRESPONDENT)

BLOOD PRESSURE WHILE YOU WAIT

FACILITIES for measuring blood pressure are now provided in Paris in chemists' shops, bathing establishments, and even in fairs and exhibitions. Last summer a member of the municipal council was walking down the Rue de Rivoli when his attention was caught by a small crowd of people waiting their turn to have their blood pressure measured, at four francs a time, by an operator who had temporarily installed himself in one of the many alcoves of this street. The councillor was shocked and lodged a complaint with the prefect of police, asking him to protect a too gullible public against this practice. In due course the prefect, after consulting the Ministry of Public Health, replied that "the measurement of the arterial pressure is not considered as a medical act." The person concerned would only be liable to punishment as an illegal practitioner of medicine if he made a diagnosis or prescribed treatment based on the readings of the sphygmomanometer. By analogy it would seem that, without a medical diploma, you can take someone's temperature and charge him for so doing, but if you wish to keep within the law you must not tell him he has fever or advise him to go to bed.

AIR AMBULANCES

Surgeon-General M. J. A. Schickelé has contributed to the August number of the *Revue du Service de Santé Militaire* a survey of the past year's work of the air ambulance service in North Africa and the Levant. In 225 flights 323 passengers were transported, 248 of them being patients and the remainder doctors, orderlies, and the like. The average length of flights was 658 kilometres, but nearly half the distance was made up of return journeys without passengers. This largely accounts for the high cost of an air ambulance service, and Schickelé suggests that expenses could be reduced by using convertible aeroplanes which would serve other functions than those of the transport of the sick.

SOME CANCER PROBLEMS

La Lutte contre le Cancer for the present quarter contains an article by Dr. R. Reding of Brussels on the gulf between the general practitioner and the specialist in the treatment of cancer. He believes the gulf is mostly due to the ultra-specialisation of medical publications on cancer, and that general practitioners are now at fault in three main directions. Many of them, rural practitioners in particular, are unjustifiably pessimistic, and on this account are slow in sending their patients to cancer centres for

treatment. Many are unaware of the cancer-generating qualities of certain drugs they prescribe daily, such as creosote, paraffin which has not been sufficiently purified, arsenic, and so on. There is also widespread ignorance of the conditions of employment which may promote cancer. Dr. Reding quotes statistics to show how curable cancer has become thanks to recent therapeutic advances. He claims that, even when a five-year standard is maintained for the durability of a cure, recovery can be anticipated in more than 90 per cent. of cases of cancer of the skin, in 70–80 per cent. of cancers of the breast, in 40–50 per cent. of cancers of the uterus, in 40 per cent. of cancers of the colon, and in 20 per cent. of cancers of the tongue.

In the same journal, Dr. C. Simonin of Strasbourg discusses the swindling, with so-called radium preparations, which has recently attained formidable proportions in France. It has not proved easy to bring to book the vendors of radium emanators and compresses. Were these preparations as potent as the vendors claim, the health of the purchasers would be gravely jeopardised. On the other hand, if they contain so little radium that no serious therapeutic action can be expected of them, the vendors are guilty of fraud. Tribunals have hitherto been embarrassed by the complexity of the technical aspects of the problem, but Dr. Simonin holds that these gentry can be prosecuted for the illegal practice of medicine or of pharmacy, and, failing these two counts, the prosecution can put forward the charge of swindling. Moreover, if the patient has suffered in body as well as in estate, the vendor of a radium outfit can also be prosecuted on this score.

PANEL AND CONTRACT PRACTICE

The Cash Side of Health Insurance

IN a broadcast discussion on Nov. 21st (reported in the *National Insurance Gazette* for Nov. 24th) Sir Arnold Wilson, M.P., suggested some drastic alterations in the cash benefit side of national health insurance. He affirmed that the administration of the cash benefits by several thousand separate approved societies and branches entailed considerable overlapping, unnecessary expense, and waste of effort; there might be members of 100 different societies in one small area, each visited by a different society representative. This overlapping made the system unnecessarily expensive, and in this respect it compared unfavourably with the contributory pensions system, which, administered from the centre for the whole country, was working smoothly and efficiently and cost only 1*s.* in the £ to administer. Another defect of administration through numerous societies was that there were wide variations in the cash benefits received; two insured men compulsorily paying the same health insurance contributions might, merely because they belonged to different societies, find themselves in different economic circumstances in time of disabling sickness. He suggested a national scheme on a territorial basis with a society in each county and county borough and a branch in each urban and rural district. The savings that would accrue from such simplification could be used to set up a benefit equalisation fund. He also recommended the institution of a funeral benefit of £15 to be paid through the Post Office. The cost would, he thought, be met by an extra contribution of 1*d.* per week; the present cost of this form of industrial insurance by private enterprise was very high, amounting to 6*s.* 8*d.* and 8*s.* for every £ of premiums collected by companies and by friendly societies respectively. Another suggestion was that workmen's compensation insurance should be linked with national health insurance, the workmen paying a contribution which should be fixed, the employers' contribution varying with the risks of the trade. He held that the primary consideration should be the restoration of the workmen's capacity to work; the question of compensation should be regarded as secondary and should, to diminish overhead charges and litigation, be settled by a special commission.

Sir Arnold Wilson was supported by Mr. Rhys Davies, M.P., who contended that State insurance not only had the great advantage of security but, working on a large scale and without the necessity of making profits for shareholders, was more economical in administration. He said that for every £ paid in workmen's compensation premiums little more than 10*s.* was received by the injured workmen; and he was convinced that this amount could be raised to at least 15*s.* if workmen's compensation insurance were operated by the State.

Mr. Stanley Duff, of the Ancient Order of Foresters, opposed the suggestion that approved societies should be abolished. He pointed out that the health insurance system, with its approved societies, had flourished while the unemployment system, administered by the State, drifted into debt a few years ago and then became insolvent with a deficit of £115,000,000. He said that with the suggested county scheme there would still be wide local variations in sickness incidence, which would, for example, be much heavier in Durham than in East Sussex. Sir Richard Meller, M.P., a former secretary of the Prudential approved society, agreed, and pointed out that the Post Office scheme of life assurance annuities failed completely and had to be closed down in 1928. The suggestion that workmen should contribute to the cost of compensation insurance would, he thought, be very unpopular.

The inequalities of insurance benefits, with no corresponding variations in the contributions compulsorily required, and the lack of adequate arrangements for equalisation between the different societies, have long been regarded as serious defects of the British health insurance system, and it is noteworthy that in the Australian system, which is based on a report by Sir Walter Kinnear, provision for equalisation has been made. Another defect of the British system, which distinguishes it from nearly all others, is the lack of a funeral benefit. But this characteristic and the approved society system of administration were due to political factors at the inception of the scheme, and such factor will have to be taken into account in any attempt that may be made to overhaul and amend the conditions under which health insurance is provided in this country.

Prescription Forms

Every insurance committee is required to check a proportion of the insurance prescriptions against its registers in order to ensure that the chemists' fund is being used only for persons entitled to medical benefit. The check is by no means simple. The handwriting of doctors at times leaves something to the imagination and such details as initials, name, and address, and whether the patient is Mr., Mrs., or Miss are seldom complete. One insurance committee has just reported that in the majority of cases checked

no address is given, in some cases neither initial nor address is given, and in others no indication is provided of the patient's civil state. The panel committee is to be asked to do what it can to remedy this state of affairs. It is rather distressing to learn that after the committee had exhausted its imagination in dealing with a batch of 6298 prescriptions it was necessary in 240 cases to write to the prescriber for further information. Unless these doctors can satisfy the committee as to the title of the persons concerned they may find themselves surcharged.

The Tale of a Test

An insurance committee took a test at a chemist's shop and, by some mischance, the name entered upon the script was that of an insured person who had had his medicines dispensed there. The man had had two prescriptions made up just before, and the chemist, naturally wondering why a stranger was handing in another form so soon, sent to the patient's address and made inquiry—finding of course that the man knew nothing about it. The test prescription contained iodide of potassium, and according to the chemist the patient had been proved to have an idiosyncrasy to this drug; on one occasion his condition was so alarming after a moderate dose that his doctor had to be sent for late at night. The chemist, in a letter to the committee, said "I expressed myself very freely and forcibly to your agent on this matter and your conduct in this miserable testing business generally." The doctor, asked what he would care to say, replied "Mr. X suffers from disseminated sclerosis. I cannot understand the chemist's letter. The patient has had iodide of potassium before."

GRAINS AND SCRUPLES

Under this heading appear week by week the unfettered thoughts of doctors in various occupations. Each contributor is responsible for the section for a month; his name can be seen later in the half-yearly index

FROM AN ANATOMIST

II

I AM afraid that I should be forced to admit that in one way a very decided change has come over the whole family of British medical students. For what I believe to be a change, I admit I have no evidence other than a general impression. It is a change that could not very well be estimated by adducing any very definite facts or by any statistical methods. Many years ago, before the era of the ubiquitous questionnaire, Sir Arthur Keith interested himself in the subject I have in mind and made a point of asking each new student why he took to medicine as a career. The method of the questionnaire is open to many fallacies that enthusiastic American propagandists often overlook, and I am afraid that, after all, I shall have to rely on impressions rather than on figures. I have an idea that a very definite class of student is vanishing from our midst, or at any rate becoming inconspicuous among a host of others. This class, which I may term in general, those that have a "call" to medicine, is in itself a complex composed of several well-defined sub-classes. The men belonging to the main class that I miss most to-day are first, those who have always wanted to be doctors, and this despite any family traditions or associations. The profession of medicine is a very definite family tradition, and many in the front rank of medicine are those whose fathers and, maybe, grandfathers, have been distinguished medical men before them. But it is not always safe to assume that mere tradition is behind the business, or even early association and an almost predestined career; for many who come of a medical stock have the thing in their blood—and these are among the best of all students. There is no better student than the son of a medical father if the boy's heart is in the work, but none is worse than he who, not caring for, or even disliking the practice of medicine, is urged on by a medical parent to qualify in order to take his place. Better even than the student who, having family traditions, takes to medicine almost by instinct is the boy who, lacking any such associations, determines, whilst still a child, that he will be a doctor. For, in this last case, he may have more than an ideal to study and to advance the science of medicine—he may have a real call to heal the sick and alleviate human suffering. It is from this class that the truly great clinician is derived. Often these students are what might be termed freaks in their families. They appear in every social stratum and their early decision to become doctors seems often to be unrelated to any outside circumstances. These are the men whose keenness should not be mistaken by the teachers in their preclinical years as evidence that they should be encouraged to take up academic research. They are the men who must be allowed to go out into the great world of practice, for they go with the assurance that they will always do that best of all research—the research that even the busiest general practitioner can do if he has the mind to do it.

* * *

Another representative of this class that seems to me to occur in ever diminishing numbers is the student who took to medicine because he wanted to know. One student told Keith that as a child he had always wanted to know how babies came and, as he could get no satisfactory explanation, resolved to go in for medicine and find out for himself. Short of this grandiose ambition, there are all sorts of things concerning life—the human body, animals' insides—and death that excite the curiosity of the young. But I do not know if it is because modern education stifles curiosity by substituting teaching for learning, or because all the child's questings are answered so frankly and so unequivocally, that very little curiosity is left in the medical student as he enters on his second year. He is quite prepared to be taught the facts necessary to ensure his passing his examinations, but he has singularly little ambition to satisfy his own curiosity by finding out things for himself.

* * *

But the man I miss most of all is the old-fashioned "bug-hunter"—the boy who collected beetles, reared caterpillars and watched all the wonderful transformations of insect metamorphosis, knew birds and eggs and kept white mice. Just what has led to the partial extinction of this type I do not know. There are probably many factors that might be involved and I could name half a dozen likely ones without solving the problem. For when all of them

have been discussed and evaluated, I cannot see any one of them that could explain the passing of the premedical student who has served such a voluntary apprenticeship in comparative osteology as is involved in making a skeleton of a frog or in burying a white mouse in a match box. It is sad, but it is true, that the man who "sugared" for moths, the man who was willing to watch for hours to witness the marvel of the emergence of a "peacock," who knew when and where the hawfinch nested—and a thousand homely and ever-satisfying things of the same kind—seems to have disappeared from the ranks of our medical students. The students to whom I am alluding are students of British stock and my remarks are not applied only to those in universities in the homeland. It seems to me a general phenomenon that the young people who constitute the post-war population of our British medical schools are almost entirely divorced from any knowledge of, or any interest in, the forms of life around them. Now although I do not know what circumstances are to blame for this, it is a fact that I very much deplore. I deplore it for the reason that the "bug-hunter" often took up the study of medicine because he had a real urge to probe into some of the great questions of life, of structure and function and all that it means. And he took up the study of medicine since it seemed that in that way he might pursue his quest and, at the same time, earn his living. It was this type that the teacher had every right to encourage in research, for he might be assured that his research would be impelled by a definite desire to know and would therefore be linked with reality.

* * *

I have said that of the first type in my class of those having the "call," it is a waste of the teacher's time to attempt to lure the student into bare academic research—since the student will undoubtedly do something far better if his ultimate circumstances permit. There are others who are easily seduced into academic research, since, nowadays, endowments and one thing and another make research, at times, a line of least resistance in planning a career. There are many doing so-called research to-day who would be better employed in some useful manual occupation: there are many whose ideas are so divorced from reality or any practical utility and whose education is so specialised that their ultimate findings are of singularly little value. It is idle to assert, as is so commonly done, that all results of research—no matter how useless they may seem at the moment—are of ultimate value. The statement is doubtless true, but, in the overwhelming mass of modern research literature, it is impossible for any man, no matter what his intellectual powers, to separate the wheat from the chaff and garner the one into the harvest and reject the other. The man who passes easily into academic research as a more or less sheltered occupation, in which neither personality, tact, nor common sense has any accepted value, is to be sharply differentiated from the "bug-hunter" turned medical student. It would be wearying to enumerate men of the type I am attempting to define. I might instance the great traveller-naturalist-medical man of a past generation: I might cite a dozen or more men who have ornamented the annals of British medicine: I might even instance Harvey and, above all, John Hunter. My greatest regret is not that I fail to find a John Hunter in the passing ranks of present-day British medical students—for him I shall never find—but I do miss the type that gave birth to such a man.

LONDON (R.F.H.) SCHOOL OF MEDICINE FOR WOMEN

Dr. Ulysses Williams presided on Dec. 1st at the school annual dinner at the Savoy Hotel when there was an attendance of more than 300, of whom a large proportion were old students. In proposing The School and Hospital, the chairman congratulated Mr. Norbury on his election to the R.C.S. council, the school on a legacy of £3000 from Miss Edith Stoney to found a scholarship, the physiological department on acquiring a sound-cinema, and pupils on winning distinction at various higher examinations. To set against this was the failure of the annual staff visit to a famous racing meeting.—Mr. J. D. McLaggan proposed The Guests, whose replies fully justified his eulogy. Miss Helen Simpson disclaimed professional standing. "I am in fact," she said, "that scourge of the profession, a doctor's wife," and as an ex-patient (after a series of expensive illnesses enjoyed because she could have them free) she offered a few observations made as a patient. To the doctor's wife who would make the waiting-room a homely place she said, "actually it is kinder to the patients to break their spirits early." The waiting-room should have on the mantel a black marble clock in the form of a sarcophagus bearing a figure of Time; on the walls two pictures, one of "Hopeless Dawn," the other Luke Fildes's "Doctor"; and on the table the *Fishing Gazette* for 1929. Thus prepared, the patient arrives at the consulting-room with not enough courage or self-conceit to tell lies. Not herself a feminist, she thought that women had something to give the medical profession—their utter lack of the pomposity which distinguished members of the other sex; if present, it was rarely more than skin-deep in women. The Witch of Endor was, she felt sure, quite good company when she got off the tripod. Women had not quite the same herd instinct as men and much less reverence for tradition as tradition. Men held together on the basis of that old school tie.—Sir Girling Ball, who followed, admitted reluctantly that Mr. Norbury and he were at school together; "he was at the top of the class, I at the bottom." As dean of the medical faculty he spoke of the interest of London University in the efficiency of the Hunter-street school and sympathised with its need for room to expand. London medical schools were, he remarked, coming into much closer collusion than was at present the case.—Mrs. Scott-Brown proposed The Chairman, reciting his achievement in many branches of sport.—There was an adjournment to the dancing floor at a commendably early hour.

THE LANCET 100 YEARS AGO

December 8th, 1838, *p.* 417.

From a paper read to the Royal Medical and Chirurgical Society by Dr. John Burne, physician to the Westminster Hospital.

. . . The history of perforative disease of the appendix especially, was then entered on. The author first pointed out the great variety of local relation for which the appendix was remarkable, the organ varying much in its place of origin, in its length, in its position, and presenting, in consequence, much embarrassing variety in its apparent seat and symptoms. . . . The author then made some remarks on the diagnosis between spontaneous tuphlo-enteritis and that occasioned by disease in the appendix, in which he held that, in the former, when the bowels were relieved, amendment usually followed; whereas, in the tuphlo-enteritis, from diseased appendix vermiformis, no such benefit could be expected to follow purgation without the removal of the irritating substance. . . . The author concluded his paper by a numerical analysis of twenty-one cases of tuphlo-enteritis that had fallen under his own observation. Of these eight died; nineteen were acute; eleven were simple inflammation of the cœcum, and all recovered. Two were chronic disease of the cœcum, and both fatal. Six were instances of perforation of the appendix, of which five were fatal. One was perforation of the cœcum from within, and recovered; one was inflammation of the appendix, with peritonitis, and was fatal.

CORRESPONDENCE

AWAITING DISPATCH

To the Editor of THE LANCET

SIR,—We have the following letter to our beneficiaries ready for dispatch, printed with suitable decoration in red and green :—

Christmas Greetings from the Royal Medical Benevolent Fund.

Dear . . .

Many supporters of the Royal Medical Benevolent Fund have kindly subscribed to a Special Fund which enables the Committee to send you the enclosed Christmas Gift of thirty shillings.

We all hope that the Gift will contribute to your happiness, and it brings from many friends Christmas Greetings and Good Wishes for the New Year.

With kind regards,

Yours very truly,

Unfortunately, Sir, we have not yet received sufficient response to my appeal to enable us to send the thirty shillings to all our beneficiaries. May I ask your readers who have not responded to my letter, which appeared in your paper during the month of October, to send a donation as soon as possible so that we may make the distribution in proper time.

Contributions, large or small, will be gratefully received by the hon. treasurer, Royal Medical Benevolent Fund, 11, Chandos-street, London, W.1.

I am, Sir, yours faithfully,

THOS. BARLOW,
President.

Nov. 30th.

TREATMENT OF TRIGEMINAL NEURALGIA

To the Editor of THE LANCET

SIR,—Dr. Gerald Slot's letter in your last issue on the value of Novocain injection of the ganglion for trigeminal neuralgia has much interested me, though I cannot claim such success with this drug as he describes in typical trigeminal tic. I first used novocain only, without subsequent alcohol, in two cases of typical spasmodic trigeminal tic, about six and a half years ago. When I was asked to give a demonstration at the National Hospital, during the meeting in London of the British Medical Association in 1932, of alcohol injection of the Gasserian ganglion, I had first to find two fresh uninjected cases, and I then tested each of them with a preliminary injection of the ganglion with 2 per cent. novocain, in order to be sure that no unexpected anatomical abnormality should spoil the demonstration. This, I may say, is the method de rigueur with all careful lecturers in demonstrating physical or physiological experiments to a class or critical audience—viz., to rehearse the actual experiment beforehand. The trigeminal anæsthesia in these cases, as I expected, lasted rather less than an hour after the novocain Gasserian injection, and the spasmodic pains returned unaltered until I injected them again with alcohol at the actual demonstration.

There are, however, other types of pain in the trigeminal area in which a novocain ganglion injection may prove of therapeutic value. In my book on "Facial Neuralgias," p. 95, I described a Gasserian test of injecting the ganglion with procaine (novocain) as a method of value in deciding whether a Gasserian block will arrest the pain, and it is especially in the more constant neuralgic cases that I use this method.

If the pain is completely arrested during the stage of novocain anæsthesia, leaving the needle in situ, a few drops of alcohol may then be slowly injected in the hope that a more permanent anæsthesia may be followed by prolonged freedom from the neuralgia. During the last eighteen months I have varied this procedure by withdrawing the needle after injecting novocain only, and waiting several days before repeating the process with alcohol, and on a few occasions I have been pleasantly surprised to find that the pain did not return after the novocain anæsthesia had worn off, and so further alcohol injection became unnecessary.

Two recent cases may be quoted shortly :—

Mrs. A, æt 40, suffering from constant right hemicrania, the pain spreading all over the right half of the head and occasionally to the left occiput. This had persisted since great worry and excitement during the crisis in September, and had been unrelieved by other treatment, when she was referred to me for possible alcohol injection. I decided to try novocain Gasserian injection, which presented no difficulties, and as soon as the trigeminal area was anæsthetic she declared the pain had disappeared, and now, a fortnight later, she is still quite free.

The other case, a man of 49, had been suffering for some months from right frontal neuralgia, not of the tic variety, but his doctor injected the supra-orbital area with alcohol. This was followed by violent almost constant pain in the right maxillary area, preventing work and sleep, and he was referred to me for alcohol injection. As the case was clearly not a true trigeminal tic, I decided to try novocain injection of the ganglion, which was also completely successful, and the facial pain disappeared with the exception of slight frontal headache.

Though Dr. Slot's case of trigeminal tic has been free for 2½ years since the second novocain injection, I should be surprised if many tic cases responded so well to novocain only, but it is well worth trying for the comfort of the patient in escaping permanent anæsthesia, if successful. If the novocain should fail after, say, two injections, then an alcohol injection can be given.

Meanwhile, I should like to congratulate Dr. Slot on his good results.

I am, Sir, yours faithfully,

Wimpole-street, W., Dec. 5th. WILFRED HARRIS.

CONVULSIVE TREATMENT OF EPILEPSY

To the Editor of THE LANCET

SIR,—I feel doubtful about the advisability of Dr. Clifford Allen's proposal in your last issue that induced convulsions might be useful in epilepsy by raising the "epileptic threshold." For some time now induced convulsions have been successfully used to dispel or curtail the psychic disturbances of the interparoxysmal period, Dr. Allen's point, however, that successive injections of Cardiazol or of triazol might raise the threshold, appears open to objection. Only a number of patients whilst undergoing a course of convulsion treatment show an increased tolerance to the drugs (both cardiazol and triazol) in that they need, with successive injections, larger doses to produce a convulsion, and such increased tolerance wears off quickly after the course has been completed or suspended for a time. Where the course is to be repeated, one must start again with the dose that initially produced a convulsion, or the over-dosage will lead to multiple convulsions. Further, there is a report of one case where apparently a latent epileptic tendency became manifest, at any rate temporarily, following the induction of convulsions.

Therefore, it seems doubtful whether the threshold can be raised by such means, and one would hesitate to induce convulsions in epilepsy except to dispel the psychic equivalents. The therapeutic range of convulsion therapy is by no means limited to cases of schizophrenia, but it would be unfortunate if the public, or perhaps even the profession, came to believe that every case, whatever its type or duration, could be cured by the induction of fits.

I am, Sir, yours faithfully,

London, W., Dec. 5th. H. PULLAR STRECKER.

INOCULATION AGAINST COLDS

To the Editor of THE LANCET

SIR,—Your leading article of Oct. 22nd is rather disturbing to anyone who has had reason to believe in the efficacy of prophylactic inoculation against colds.

It is impossible for the general practitioner to state categorically that a patient acquires immunity after a course of vaccine, but it is possible to say that many patients previously extremely susceptible to colds appear to resist infections after such a course, for periods of eighteen months to two years, and this has been my experience during eighteen years of practice in South Africa, Rhodesia, and Kenya.

I always use the Compound Coryza Vaccine prepared by the South African Institute for Medical Research in Johannesburg, and have found that in some 70–80 per cent. of cases immunity, or apparent immunity, is conferred. It is rather disappointing to think that such effects are post not propter hoc. I cannot believe that these results are merely psychological, particularly as in one of my successful cases previous prophylactic vaccines in England had failed.

I am, Sir, yours faithfully,

G. DUNDERDALE.

Nanyuki, Kenya Colony, Nov. 30th.

THE "IRON LUNG"

To the Editor of THE LANCET

SIR,—I read with interest Sir Henry Gauvain's letter on the Iron Lung and support his comments. In the *Daily Telegraph* of Nov. 26th I recalled that in 1934, through the generosity of the Imperial Chemical Co., and acting under the advice of Dr. T. E. Stowell and Dr. G. P. Crowden, I obtained for the Hospital for Sick Children, Great Ormond-street, the first *English-made* "lung." The makers (the Siebe Gorman firm) gave us every help with technical advice and we had the assistance of the skilled sister of my ward, Miss Magall. It was an interesting experience, confirming my belief in the high intelligence of the British, and the virile courtesy of our profession. The lay committee thought I was dealing with some new form of mechanism for providing drinks, and with some difficulty a certain number of students, nurses, and a few doctors were collected to hear an excellent demonstration by Dr. Crowden and Mr. Gorman Davis. The press also showed interest.

The immediate object of this letter, however, is to give my opinion—knowing something of the pathology of polio-encephalitis—that we cannot expect very much. If the outlying zone of the lesions are in question, then the "lung" will help, but I have seen serious lesions near the vital centres recover without such help because the respiratory apparatus was only threatened and not killed. Diphtheritic paralysis, provided the heart is not too much damaged, is more encouraging. It is the use of the lung in fires, partial electrocution, drowning, gas poisoning, mine work, and so forth, that appears to me also to require special study. These uses were well recognised by the American pioneers, the brothers Drinker. I am sure Sir Henry is right to insist upon the care of these "life or death" instruments, and the need for trained assistants.

I am, Sir, yours faithfully,

Bath, Dec. 2nd. F. JOHN POYNTON.

PERCUTANEOUS ABSORPTION OF MALE HORMONE

To the Editor of THE LANCET

SIR,—Dr. Alfred A. Loeser has drawn my attention to the fact that in a letter to THE LANCET of May 14th, 1938 (p. 1134), he mentioned briefly that he had treated cases of thyrotoxicosis in women by percutaneous application of an alcoholic solution of testosterone propionate. He said that the percutaneous dose corresponds to the dose given intramuscularly; also, he made brief mention of this application at the Congress of Obstetrics and Gynæcology in Amsterdam on May 8th. I must ask Dr. Loeser to accept my apologies for omitting this reference in my paper.

In your annotation (p. 1308) discussing the possibilities of oral therapy with testosterone and the more recent derivatives—methyl testosterone and ethinyl testosterone—it is pointed out that the species difference in rats and rabbits of oral therapy with methyl testosterone has given rise to some ambiguity as to their efficacy by this route and their possible application to human therapy. In preliminary experiments with testosterone by mouth I have produced slight potency in a eunuch by giving 100 mg. daily, divided into ten hourly doses of 10 mg. (4×2·5 mg. tablets). Although at present this is an extremely wasteful method, in view of its apparent activity I hope to increase the doses given and to try methyl testosterone and ethinyl testosterone.

I have found that progesterone has almost as much androgenic activity by injection in the eunuch as testosterone propionate, and it would be extremely interesting to discover whether anhydro-oxy-progesterone, although apparently non-androgenic in laboratory animals, is active by mouth in man, in view of the marked increase in œstrogenic activity of the ethinyl derivative of œstradiol when given orally.

I am, Sir, yours faithfully,

Bristol, Dec. 5th. G. L. FOSS.

SPONTANEOUS HÆMOTHORAX

To the Editor of THE LANCET

SIR,—In your issue of Oct. 8th (p. 831) Dr. Kenneth Perry says that in spontaneous hæmothorax "the patient will be shocked and show evidence of internal hæmorrhage." This statement is undoubtedly supported by almost all the reports on such cases. However, a case which I published in the *Klinische Wochenschrift* of June 20th, 1936 (p. 906), shows that occasionally the symptoms may be very mild. That patient, from whose pleura more than 300 c.cm. of pure blood had been extracted, was never shocked, had only moderate pain which did not prevent him from walking about in his room, and did not show any signs of internal hæmorrhage.

I am, Sir, yours faithfully,

ERIC G. VIO,
Assistant Superintendent of Hospitals,
Shanghai Municipal Council.

Nov. 5th.

A NEW CHEMICAL CONTRACEPTIVE

To the Editor of THE LANCET

SIR,—On Oct. 29th you published a letter from my friend, Dr. Margaret Hadley Jackson. This letter contained a table, the last column of which was intended by the author to show how many women had become pregnant after Volpar gels had been distributed to them. Most unfortunately this column contained Roman figures, for which it would have been much better to substitute asterisks, &c., since the figures were simply references to footnotes. I wrote at once to Dr. Jackson saying that I thought people would misunderstand the table by taking the Roman figures to represent the number of pregnancies, which is exactly what has happened.

A firm of manufacturers of chemical contraceptives has misinterpreted the table and has written to an influential clinician, saying that Dr. Jackson's table shows that there have been six cases of failure with volpar. This is completely erroneous, and I beg to be allowed to state the facts, which are as follows:—

(1) *Volpar gels.*—Three women have become pregnant who claim to have used volpar gels. (One woman, who became pregnant when she had run out of supplies of the gels, is omitted from consideration.) Dr. Jackson does not believe the statements of two of these three women that they actually used the gels. (They were relying on sheaths; in one case the sheath had a hole in it and in the other it slipped off during coitus.) The third woman, who is not disbelieved, was using an early version of volpar (P.338) with no occlusive device. She is multiparous and has a split cervix. The volpar gels which are on sale to the public, and which were used throughout the clinical test except at the beginning, are No. 383/2A; these are shown by laboratory tests to be more reliable than P.338, and there is not yet a credible record of a pregnancy occurring with them. Volpar gels have been distributed by a number of doctors on quite a large scale for a long time. No pregnancy has been reported by any doctor except Dr. Jackson.

(2) *Volpar paste.*—No woman to whom volpar paste has been distributed is known to have become pregnant.

I am, Sir, yours faithfully,

JOHN R. BAKER.

Sir William Dunn School of Pathology, Oxford, Dec. 5th.

TREATMENT OF LOBAR PNEUMONIA WITH M. & B. 693

To the Editor of THE LANCET

SIR,—In the very interesting paper by Dr. Dyke and Dr. Reid in your issue of Nov. 19th I noticed that in every case there was almost immediate improvement in the general condition, in the pulse-rate, and the temperature—i.e., in the general clinical condition—leading to uninterrupted recovery. But nothing was said about any changes in the physical signs. Some years ago when using the "abortive treatment" of pneumonia by stock vaccines—very successfully in early cases—I found that whilst the temperature came down to normal within a few hours, with a corresponding pulse-rate and general amelioration of the symptoms, the physical signs remained characteristic of lobar pneumonia (e.g., dullness, tubular breathing, &c.) and resolution took about the same time as in average cases of recovery treated by ordinary methods. I should be interested to know if the same thing obtained in these cases treated with M. & B. 693 or if resolution took place pari passu with the amelioration of the symptoms.

I am, Sir, yours faithfully,

CHARLES H. BARBER.

Portland-place, W., Nov. 23rd.

PARLIAMENTARY INTELLIGENCE

CANCER TREATMENT

THE Cancer Bill, which was to have been taken on Dec. 6th, has been postponed until the 13th. Its main purpose is to establish a cancer service under which modern facilities for diagnosis and treatment will be available in every part of the country. The Bill places an obligation on the major local authorities to consult with the Radium Commission and bodies representing local hospitals and doctors, and to prepare arrangements for ensuring that the facilities in their areas are adequate. The arrangements will include in-patient and out-patient treatment in hospitals or clinics and the payment of travelling expenses where necessary. The cost of the new service will be partially covered by an Exchequer grant, which will be scaled up or down according to the needs of the area. Grants will range from 85 per cent. of the additional expenditure in the case of the poorest areas to about 21 per cent. in the richest. It is estimated that when the service is in full operation the additional expenditure will amount to about £600,000 a year in England and Wales and £100,000 in Scotland. The Bill provides for loans not exceeding £500,000 to be made to the National Radium Trust for the purchase of additional radium and apparatus. It also prohibits the advertising of cancer treatments except to members or students of the medical, nursing, and pharmaceutical professions, to suppliers of surgical appliances, or in technical journals. The term advertisement includes "any notice, circular, label, wrapper or other document, and any announcement made orally or by any means of producing or transmitting sounds." The prohibition does not apply to local authorities or the governing body of a voluntary hospital.

MEDICAL SERVICES IN CIVIL DEFENCE

In the House of Commons on Nov. 30th, Sir FRANCIS FREMANTLE moved:

That this House recognises the call upon medical services in case of air raids as a cardinal factor in such an emergency; is of opinion that a complete and detailed scheme is required providing for the medical and auxiliary personnel, the institutions, equipment, communications, and transport entailed; and demands that both policy and administration shall be devised without delay and carried out under responsible coöperation between the British Medical Association and other representatives of the medical profession and of the hospitals, with the several Government departments concerned.

There was no intention, he said, in this motion to glorify the medical profession, but it was necessary to open the eyes of those people, whether in authority or otherwise, who looked upon the medical service as being only a technical extra. The medical services must be given their proper position. The public were perfectly tepid on the subject of preparation until the crisis in September. The medical officer of health to the London County Council had sat on five committees on the subject since 1930, under three Government departments, and only the last one, the Wilson Committee, seemed to have done anything effective. The medical profession had started a register of its own members, at its own expense, with a very complete questionnaire, no less than eighteen months ago. But even doctors moved sometimes; even doctors changed their minds as to what they wanted to do, what they could do, and what they were best fitted to do. For the register to be of any use it must be revised every year. The Government had,

he understood, undertaken the cost of revision of the register, which amounted to something like £500 a year in England and £200 in Scotland. The result of the questionnaire showed that 43,000 doctors had undertaken to serve, stating their equipment and experience, and 95 per cent. of them were prepared to give their services in one way or another.

FIRST-AID POSTS

Of the difficulties that arose when the crisis came, not the least was the uncertainty as to the position and equipment of, and the demands that would be made on, the first-aid posts. In London first-aid posts were apparently not to have any medical officer at all; they were to be lay posts, from which patients would be sent on to the general hospitals that had been earmarked as clearing stations, and thence by ambulance to base hospitals at some distance out in the country. The casualty clearing stations would be blocked up with a mass of minor cases. In an air raid, in addition to actual casualties, they might have to deal with a large number of medical cases among the civil population—cases of nervous breakdown, hysteria, mania, and so on. Moreover, some cases might need morphia, which lay people could not be allowed to administer. In a military system there were always medical officers at first-aid posts. The posts would not necessarily require the presence of a medical man night and day. Someone should be in charge, preferably a medical man in practice in the neighbourhood, who could run in and out and be available.

Why should the first-aid posts be under the Home Office, while ambulances, stretcher squads, casualty clearing stations, and hospitals were all under the Ministry of Health? That seemed to be a very wrong proposition. The British Medical Association had established a central emergency committee for the supply of medical services, with associated committees of reference of the Royal College of Physicians and the Royal College of Surgeons, but they still wanted some body to coördinate the demand that they would have to meet. The Minister for the Coördination of Defence had promised that a coördinating committee would be forthcoming; it was very seriously needed.

The medical services were a cardinal factor not only in treating the people but in giving confidence. Medical men would have to play the chief part in administering and organising those services. The scheme must be complete, and it must be detailed. There must be, first of all, the medical personnel, which would include retired men and medical students.

Then the auxiliary personnel: the nurses, dispensers, laboratory workers, clerks, stretcher-bearers, and messengers. The question of communications was too often forgotten. In an air raid the medical services would be powerless if they were not able to communicate with medical men, to find out where to send patients, and where the ambulances were. There must be a proper organisation. This committee that had been suggested, on which hospitals, the medical profession, the Government departments concerned, and the local authorities must be represented, should be responsible for policy and administration instead of the Ministers and the Government departments.

In seconding the motion Sir HENRY MORRIS-JONES supported Sir Francis Fremantle's plea for medical officers at first-aid posts to separate the simple from the grave case and deal with those minor injuries and illnesses that would otherwise block the main hospitals.

THE POSITION OF THE HOSPITALS

In London, as far as he understood, 15 voluntary hospitals and 19 municipal hospitals had been earmarked for use as casualty clearing stations. All the others, including some of the big teaching hospitals, and tuberculosis, children's, and maternity hospitals, were to carry on as usual. It was questionable whether, in the event of an intensive bombardment of London or any big city, they ought to keep any ordinary cases of sickness in the hospitals. He hoped the policy would be adopted that hospitals in London, of whatever kind, unless they were clearly outside the radius of possible bombardment, would evacuate all their patients to their homes, or to hospitals in the interior of the country. On the boards of management of hospitals there was very serious concern and misgiving at the present time in regard to their position.

Here was a letter from a big hospital in the north of England:—

> Our great difficulty was to discover what was expected of us. When the crisis arose, nothing had been decided; the medical officer had no instructions, while no preparations had been made for his temporary first-aid hospital to which the staff here was to be transferred further inland. What would be most appreciated is a definite lead, or instruction, as to what is expected of this hospital in any future emergency.

That gave an indication of what some of the hospital authorities felt.

With regard to equipment, the medical officer of a hospital in Sir H. Morris-Jones's constituency wrote to him a short time ago:—

> Having been asked on the Tuesday before the zero hour to be ready to equip a building as a hospital at 12 hours' notice, I decided to order in dressings, drugs, &c., equivalent to two years' stock for this sanatorium. But none of the firms written to—wholesalers I always dealt with—could supply me. All were sold out; they would take my order and deliver in rotation. Morphia was ordered from one of our biggest wholesale and retail firms of manufacturing chemists. None was available. They wrote me they had built up their stocks; but the demand was unprecedented and could not have been foreseen.

Since then he had had from the Ministry a reply which gave him some assurance with regard to the provision of medical supplies.

It was essential that there should be no waste of personnel. The staff of hospitals should know whether they would be wanted in the hospitals, in the Territorial service, or in their own civilian occupations, and there should be a mobilised force of doctors which could be transferred to any centre which had suffered intensive bombardment. He wanted the Government not only to organise but to give the appearance of organising, in order to stimulate the vast body of people who wanted to do what they could. It might mean all the difference between victory and defeat in a war. (Cheers.)

Colonel NATHAN, who is chairman of the air-raid precautions committee of Westminster Hospital, said it was impossible in the recent crisis for those responsible for hospital administration to make sure that they were in touch with the right authority. Hospitals must be told well beforehand from whom they could expect to receive instructions and guidance. Undoubtedly the British Medical Association register was a valuable piece of work, but when the crisis actually arose it was not of such immediate use as might have been expected. On making inquiries at the Emergency Services Administration at the Ministry of Health for additional medical staff, he was informed that the register would not be operative for at least a fortnight after the crisis arose. It would be necessary greatly to increase the available hospital accommodation in the country districts outside London, where it was at present probably not more than sufficient for normal local needs. It was also vital to establish a relationship between the voluntary hospitals in London—the most vulnerable centre—and some satellite institutions in the country to which patients could be evacuated. Hospitals should not be asked to take walking cases; they should be dealt with at the first-aid centres, where cases should be divided into categories—gas, shell-shock, and surgical. It would be necessary to have another sorting in premises adjacent to the hospital by the hospital medical staff if there was not to be great congestion, and if

the hospitals in the danger centre in the most vulnerable part of London were to be able to take, as they had been told they must do, 400 cases each. The medical staffs of the hospitals must know beforehand what was expected of them. Many men were attached to more than one hospital and had, legitimately, more than one loyalty. There was also the question as to whether it was right to keep the highest skilled medical men in London at all. This question arose also in regard to the nursing staff. It was also desirable to consider what should be done with the medical schools. Were they to be retained in London, brought to an end, or transferred to the country?

Dr. EDITH SUMMERSKILL said that when the crisis came the Government's plan for dealing with casualties did not operate in many places, there was a condition of chaos and muddle in others, and in some important casualty clearing hospitals there was a lack of equipment just where there should have been extra supplies. Many conscientious medical officers of health had already earmarked their buildings for first-aid posts but were looking desperately round for personnel. She felt that they could not necessarily depend on the 95 per cent. of the doctors of the country who had offered their services. The Government had made a bad mistake in propaganda. It had told the public constantly about the need for air-raid wardens. In an air raid she would much prefer to know that there was an efficient surgeon, an ambulance, and a dresser waiting for her, rather than an air-raid warden somewhere round the corner. She asked the National Government seriously to consider the national control of medical supplies.

THE GOVERNMENT REPLY

Mr. BERNAYS, Parliamentary Secretary to the Ministry of Health, said that what the Government had in mind for the expansion on a great scale of the medical services of the country in time of war was briefly a regional organisation for dealing with casualties on the basis of first making available beds in existing institutions, and then expanding those facilities by satellite annexes. For personnel there was a register of doctors and nurses and a scheme for filling all needs from these registers on a unified basis. The emergency work had given them a working plan and they were now at work on a series of further plans which would form the basis of regional discussion. Some months ago the British Medical Association, on the invitation of the Committee of Imperial Defence, compiled a register of the available medical personnel, and if war had come that personnel would have been directed through the Central Emergency Committee to the places where the needs were greatest. Doctors had complained that having registered with the British Medical Association they had heard nothing more of the matter. The register was a file, not an order to move. Its object was to obtain the information upon which orders to move could alone be given. It was quite impossible to give such orders until air raids actually began and it was possible to estimate where the main attacks would be delivered. Clearly, at the outbreak of war, the best place for a doctor was with his own patients. There was bound to be a heavy strain on his practice, particularly in areas into which the populations from the crowded areas were being evacuated. In any case, the most obvious air-raid dressing station was a doctor's own consulting-room. It was most important to avoid any immobilising of doctors by collecting them together before there was need for their services.

Sir F. FREMANTLE: That is a complete volte face from the original idea of the Home Office, that the air-raid posts would not have doctors at all. Obviously they could not be in the doctors' surgeries.—Mr. BERNAYS said he was coming to that point. Of course the position was different now that the Ministry of Health had taken over the matter.

It had been suggested, Mr. Bernays continued, that in many cases a dual claim was being made on the doctor by the fighting services and the civilian organisation. Not all the Territorial Army hospitals originally designated would necessarily be mobilised on the outbreak of war. This would mean that some hundreds of doctors would be available for treating civilians. Meanwhile discussions were taking place between departments on the whole question of requirements that might be conflicting. With regard to nurses, during the crisis arrangements were made to put hospitals in touch with the local nursing organisations; experience had shown that some more complete organisation was necessary and a central register of nurses and nurse auxiliaries who would be available in time of war was being established.

Sir F. FREMANTLE: With regard to nurses and auxiliaries will there be some arrangement by which the function of the St. John Ambulance and the Red Cross would be clearly defined?—Mr. BERNAYS: Yes, that is under consideration now.—Dr. SUMMERSKILL: Do the Government contemplate any training scheme for the nurses and any new method of improvement?—Mr. BERNAYS: Yes, there is under consideration now a plan for the recruitment of additional nurses and for giving a training to girls, at any rate to do first-aid work.

Continuing, Mr. Bernays said that the Government had been deeply conscious of the need for a greatly expanded potential hospital service and as a preliminary to this they undertook early this year a survey of the whole of the existing hospital accommodation in England and Wales while the Department of Health did the same in Scotland. In England and Wales the survey covered just under 3000 hospitals and institutions, and just over 400,000 beds. Hospital officers from the headquarters staff proceeded to every region in the country with instructions to prepare schemes for freeing as much hospital accommodation as possible in the most congested areas of their regions, so that if an emergency should develop before it was possible to evolve more elaborate schemes, some provision for early casualties would be available. On the outbreak of war there would have been 150,000 beds available for air-raid casualties and he was confident that at the end of a fortnight that number would have been increased by an additional 100,000. Meanwhile the Home Secretary had appointed a committee of medical experts, under the chairmanship of Sir Charles Wilson, to consider what was required for a casualty organisation in the London area. Their conclusions were incorporated in a circular sent to every county council, county borough council, and voluntary hospital authority in the country informing them that every hospital must be ready to clear as many beds as possible on receiving warning from the Government that an emergency had arisen, and that they must take steps to see how their accommodation could be expanded in case of need. Every hospital was informed as clearly as was possible at that early stage of what would be expected of it. Later the Ministry of Health made direct contact with some hundreds of hospitals, and all the while the hospital officers were making contacts in their regions. The department, having no foreknowledge of the emergency, could not possibly allot a precise part to everyone of the 3000 hospitals and institutions in the country.

Until recently the first-aid posts and the ambulance service were the responsibility of the Home Office. They had now been transferred to the Ministry of Health, so that both the transfer and the treatment of air-raid casualties were the responsibility of a single department. Local authorities would continue to be responsible for preparing schemes for an ambulance organisation and for first-aid posts, but the Ministry would see that these were properly complementary to the hospital service; and that the first-aid posts in particular were so placed and designed as to relieve hospitals so far as that could possibly be done.

With regard to equipment they had ordered 50,000 bedsteads and mattresses, and between 10,000 and 20,000 had been delivered and would be

distributed as soon as the hospital schemes were settled—it was hoped in a few weeks. They were in process of delivering 90,000 stretchers to local authorities and 20,000 blankets to the London County Council. In addition 150,000 blankets were being ordered for distribution to provincial hospital authorities. Arrangements were made during the crisis for large-scale requisitioning and the department were advised that there were large stocks in the country. The London County Council had been authorised to spend £4000 on equipping ten of their large fever hospitals (which would have been evacuated) with surgical equipment. He had taken note of points raised during this debate in regard to the difficulty at the last moment of getting necessary medical requisites and that question was being actively taken in hand in his department. The majority of the stores that had been laid in by hospitals could be used in the future, and therefore did not involve a loss.

Transport was a vital question in clearing the hospitals. In London alone, in addition to the patients who were to be sent home, between 3000 and 4000 patients, taken from 34 of the larger general hospitals which would be most valuable to the casualty organisation, were to be removed on stretchers to smaller towns fifty miles away. The policy was to evacuate as many as the medical officers thought were fit to travel. Arrangements were made to convert at twenty-four hours' notice 300 Green Line buses into ambulances each capable of taking 11 stretchers, and to assemble 21 ambulance trains at selected stations (not the termini). The St. John Ambulance Brigade arranged to provide stretcher-bearers to carry patients from the buses to the trains. On Sept. 24th the necessary number of stretchers were distributed to each evacuating hospital. From that point onwards the hospital evacuation scheme for London could have been put into force at twelve hours' notice.

With regard to the need for a long-term plan carried out under responsible coöperation between the British Medical Association and other representatives of the medical profession and of the hospitals, with the several Government departments concerned, there was no question of asking the Government to devise such a scheme "without delay"; it was already in existence. Hospital officers had been reviewing the hospital accommodation in their regions and the next step was for them to agree with the hospital authorities concerned exactly what part they would be expected to play. It was hoped shortly to arrange a series of regional conferences with the hospital authorities and representatives of the medical profession. So soon as plans were settled—and it was hoped that for the most part they would be before the end of the year—equipment would be distributed and work undertaken to improve facilities where required. The next stage would be to consider what was required in the way of completely new hospital accommodation—either by earmarking existing buildings which could be converted in emergency, or by preparing sites where huts or tents could be erected. If civilian evacuation was carried out on a big scale a heavy strain would be thrown on the medical services of the receiving areas, and in working out the emergency hospital schemes the department were keeping that problem in mind. It would be necessary to concert plans with the British Medical Association for transferring doctors to country districts where the influx of new patients called for a strengthening of the local medical services.

Sir F. FREMANTLE: Will my hon. friend say whether this organisation of which he has spoken is in absolute, vital touch with the Army, Navy, and Air Force, especially as regards the demand on medical personnel and the hospitals?—Mr. BERNAYS: Yes, I can certainly give that assurance.

Captain ELLISTON said he was delighted to hear that it was the intention to make full use of the register compiled by the British Medical Association. He had been told that in the late crisis the Royal Army Medical Corps, the Royal Air Force, and the Royal Navy were drawing on that list without full consultation with the organisation of the profession that had prepared it. Now that the register would come under the charge of the Ministry of Health he assumed that there was no danger of such a thing happening again.

NOTES ON CURRENT TOPICS

Psychological Treatment of Offenders

In the course of the debate on the motion of Sir Samuel Hoare for the second reading of the Criminal Justice Bill in the House of Commons on Nov. 29th, Mr. BENSON expressed satisfaction that power was to be taken in Clause 19 of the Bill to supply mental treatment for those delinquents who required it. But while there were many highly trained psychiatrists and specialists in London there was nothing like the same supply in the provinces. The State remand centres should, he thought, be made the nucleus for the development of psychiatrist services on a wider scale. He hoped that there would be a number of these centres in the provinces, but there would not be one in every small town. They should utilise the trained doctors in these remand centres. Travelling psychiatrists from these centres could go from court to court, or be at the service of any court within a given area, coöperating with child guidance clinics and education committees, and so establishing part-time services.

QUESTION TIME

THURSDAY, DEC. 1ST

Tuberculosis in Wales

Mr. JAMES GRIFFITHS asked the Minister of Health if he had now received the report of the committee which investigated the problem of tuberculosis in Wales; and whether he proposed to published the report.—Mr. ELLIOT replied: The answer to both parts of the question is in the affirmative. The report was received on Nov. 7th and should be available shortly.

Iron Lungs

Sir ROBERT YOUNG asked the Minister of Health whether he was in a position to increase the number of iron lungs in this country to cope with the demand for such life-saving implements in cases of certain illnesses; and, if not, whether he would consult with health insurance societies with a view to making good the deficiency out of their large surplus funds ear-marked for additional health benefits or invested through Government channels for future requirements.—Mr. ELLIOT replied: The hon. Member will be aware of the offer of Lord Nuffield to supply these appliances gratuitously to all hospitals in the country which require them. I am glad to avail myself of this opportunity of expressing my appreciation of his generous action in making available this useful article of hospital equipment for all sufferers who can be benefited by it.

Sir R. YOUNG: Can the right hon. gentleman say whether the use and upkeep of this life-saving instrument will be great?—Mr. ELLIOT: It is very difficult to say.

Sir F. FREMANTLE: Is it not possible that a much cheaper form of apparatus made of rubber materials, which is also in use, may be able to supplement the needs in those places where they have not iron lungs?—Mr. ELLIOT: I think that mass production will probably lead to a cheapening of their cost.

Qualified Refugees and Hospital Appointments

Mr. GARRO JONES asked the Minister of Health whether he would consider the establishment, in coöperation with local authorities, voluntary organisations, or otherwise, of a number of hospitals and clinics to be staffed by medical and other refugees and placed in areas where specialist and general facilities for treatment of disease were inadequate.—Mr. ELLIOT replied: Responsibility for health matters is by statute entrusted to local authorities who have in particular power to provide institutional accommodation. The employment of personnel is at the

discretion of the local authorities and I do not think it would be possible for me to take steps as suggested by the hon. Member.

Mr. GARRO JONES: Does the right hon. gentleman recognise that no local authority, apart from the London County Council, has a jurisdiction wide enough to make such a proposal practicable, and will he therefore undertake at least to consider this suggestion and discuss it with local authorities and voluntary organisations concerned?—Mr. ELLIOT: Many of the great local authorities are quite comparable with the London County Council in the population they cover and the revenues which they enjoy. If the voluntary organisations have any proposals to lay before me I shall be glad to consider them.

TUESDAY, DEC. 6TH

Dentists' Qualification Fees

Mr. HOPKIN asked the Minister of Health if his attention had been drawn to the fact that dentists qualifying after 1921 had to pay an annual fee of about £4, whereas other dentists had to pay no annual fee; and, in view of the dissatisfaction amongst dentists, would he cause an inquiry to be made into the whole question of the payment of such fees.—Earl WINTERTON (Chancellor of the Duchy of Lancaster) replied: The Dentists Act, 1921, provides that payment of the annual fee to which the hon. Member refers may be required only in the case of dentists registered after the commencement of the Act. This provision, which preserved the rights of those practising dentistry before the Act was passed, gave effect to a recommendation of the Interdepartmental Committee on the Dentists Act, 1878. So far as I am aware it has not caused any general dissatisfaction in the dental profession, and I do not consider that further inquiry into the question is called for.

Mysterious Illness of a Ship's Crew

Mr. WINDSOR asked the Minister of Health whether he was aware that 14 members of the crew of the oil tanker *British Petrol*, lying at Purfleet, Essex, were detained in the Denton isolation hospital on Nov. 27th suffering from an illness which had not been diagnosed; and whether he had now any information as to the nature of the illness and its cause.—Mr. BERNAYS, Parliamentary Secretary to the Ministry of Health, replied: I am informed that 21 members of the crew of this ship were admitted to hospital in London suffering from colic accompanied by diarrhœa and fever, and that two further cases were reported when the ship reached the Tyne. It appears that the illness was the result of food poisoning due to one of the salmonella group of organisms, but it is not now possible to ascertain to what particular article of food the infection was due.

PUBLIC HEALTH

Small-pox at Pateley Bridge

AFTER an interval of four months with no small-pox in this country three cases are notified in the Registrar-General's weekly return. On Nov. 25th Dr. T. N. V. Potts, M.O.H. for the West Riding of Yorkshire, was informed by Dr. C. A. Flintoff, M.O.H. for the Nidderdale rural district, of a suspected case. The man was a farmer, aged 73, selling milk in the district, and living with his wife, two daughters, and a son. On Nov. 18th he shivered and had pains in the head and trunk, noticing a rash on the 23rd. The rash appeared first on the forehead, spreading rapidly over the rest of the body. It did not appear in successive crops. When examined on the 25th the rash was fairly evenly distributed over trunk, limbs, face, and scalp. Many pocks were deeply set in the palms and soles. They were of uniform size with little crenation. The farmer was sure he had been vaccinated in infancy, but no marks were to be seen. Dr. H. C. Petch, the family doctor, had ascertained that one of the farmer's daughters, returning from Oporto on the *Anselm*, reaching Liverpool on Oct. 21st, had been ill with "a kind of influenzal attack" on Oct. 30th, and noticed a very slight rash on Nov. 4th. She was a governess in the district and had been sent home by her employers because of this illness. Examination revealed about a dozen pock marks scattered over trunk, face, and limbs, the contents of which had, she said, shelled out like peas. It was then further ascertained that the younger sister had suffered from an "influenzal attack" on Nov. 17th and also had typical pocks, about ten in number, distributed over the body, one or two on the face. Both daughters had four good vaccination marks dating from infancy. The farmer was removed to hospital where he is now very ill. A complete list of contacts has been drawn up for the use of the sanitary inspectors, and neighbouring health officers have been warned by circular. A point which may or may not be relevant is the elder sister's statement that the wireless operator on board her ship was said to have suffered from an infectious disease with a rash on the previous voyage.

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED NOV. 26TH, 1938

Notifications.—The following cases of infectious disease were notified during the week: Small-pox, 3 (Ripon and Pateley Bridge R.D.); scarlet fever, 1969; diphtheria, 1535; enteric fever, 21 (33 "expected"); pneumonia (primary or influenzal), 659; puerperal pyrexia, 155; cerebro-spinal fever, 19; acute poliomyelitis, 39; acute polio-encephalitis, 3; encephalitis lethargica, 3; relapsing fever, 1 (Dover); continuous fever, 1 (Paddington), dysentery, 73; ophthalmia neonatorum, 87. No case of cholera, plague, or typhus fever was notified during the week.

*The combined notifications of acute poliomyelitis and acute polio-encephalitis total as follows for the current week and the previous 18 weeks (working backwards): 42, 47, 53, 73, 74, 88, 85, 68, 56, 63, 83, 76, 82, 76, 83, 87, 63, 41, 29.

The number of cases in the Infectious Hospitals of the London County Council on Dec. 2nd was 3166, which included: Scarlet fever, 786; diphtheria, 1105 (carriers, 23); measles, 8; whooping-cough, 379; puerperal fever, 21 mothers (plus 10 babies); encephalitis lethargica, 272; poliomyelitis, 14. At St. Margaret's Hospital there were 26 babies (plus 12 mothers) with ophthalmia neonatorum.

Deaths.—In 126 great towns, including London, there was no death from small-pox, 1 (0) from enteric fever, 3 (0) from measles, 1 (0) from scarlet fever, 7 (1) from whooping-cough, 31 (4) from diphtheria, 37 (11) from diarrhœa and enteritis under two years, and 28 (4) from influenza. The figures in parentheses are those for London itself.

Ipswich reported the only death from typhoid. Fatal cases of diphtheria were scattered over 26 great towns, 3 at Manchester, no more than one elsewhere. Bradford had 4 deaths from diarrhœa, Liverpool and Birmingham each 3.

The number of stillbirths notified during the week was 256 (corresponding to a rate of 42 per 1000 total births), including 38 in London.

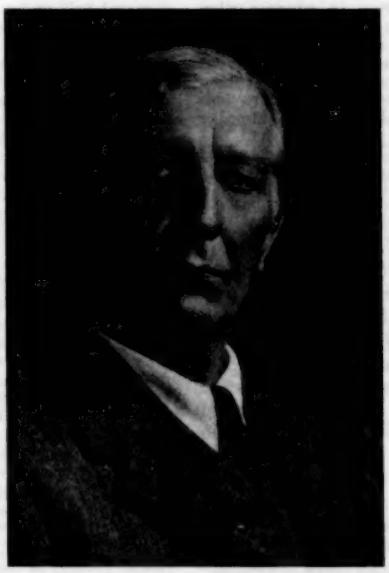
OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.—The annual congress of this society will be held at 1, Wimpole-street, London, W., on April 20th, 21st, and 22nd. Mr. R. Affleck Greeves, Mr. Charles Goulden, and Mr. A. Harold Levy will open a discussion on the problems of refraction and Prof. H. J. M. Weve will deliver the Bowman lecture. His subject will be diathermy in ophthalmic practice. Further information may be had from the hon. secretary, Mr. Frank Law, 36, Devonshire-place, London, W.1.

OBITUARY

WILLIAM McDOUGALL, M.B. Camb., F.R.S.

Prof. McDougall, who was suffering from abdominal cancer, died on Nov. 28th at his home in Durham, North Carolina, leaving the world poorer for the loss of a great psychologist and a forceful personality.

William McDougall was born in 1871 in Lancashire, the son of a successful chemical manufacturer; after attending a local private school, he was sent at the age of 14 to Germany where he studied for a year at Weimar. When he was 15 he entered Owens College, Manchester, where he spent the next four years. He took the M.Sc. degree at the (then) Victoria University, and later was awarded a doctorate in science at the University of Manchester. In 1890 he went to St. John's College, Cambridge, with an entrance scholarship. Here he specialised in physiology and anatomy (including anthropology), and became one of the first pupils of the late W. H. R. Rivers, whom Michael Foster had just brought to Cambridge to teach the physiology of the senses and experimental psychology. Later he took the M.A. and M.B. degrees at Cambridge and was elected a fellow of St. John's. He entered St. Thomas's Hospital with a university scholarship in 1894, but spent each of three long vacations at Cambridge in research on muscular contraction; the hypothesis as to its nature which he framed was the subject of one of his two theses for his college fellowship. It was at this period that he first became acquainted with William James's "Principles of Psychology." This work, no doubt, stimulated his persistent desire to solve the problem of the relations between body and mind; he submitted a dissertation on it as the second thesis for his college fellowship. Only a few days before his death he received the news that his old college had conferred on him the distinction of an honorary fellowship. After gaining in 1896 the Grainger testimonial prize he served as house physician at St. Thomas's.



[Lafayette

In 1898 McDougall accepted A. C. Haddon's invitation to join the Cambridge Anthropological Expedition to the Torres Straits and Sarawak, specialising on the cutaneous sensibility (especially pain and tactile localisation) of primitive peoples. Surviving medical colleagues of this expedition are C. G. Seligman and C. S. Myers. In Sarawak he was attracted to the ethnological studies begun by his host, Charles Hose, of the natives of his district. They began to work together on a book published in 1912 under their joint names, "The Pagan Tribes of Borneo." On his return to England in 1899 he married Anne Hickmore of Brighton and decided to spend the first year of his wedded life in Göttingen where he worked under G. E. Müller. In his wife he found a devoted and tactful helpmate. They had a family of four sons and two daughters, of whom three sons and one daughter are now living. During his stay in Göttingen he devised the first form of his well-known dotting-test which has proved one of the most valuable instruments in the estimation of mental fatigue, in studying the effects of drugs, and in differentiating the obsessive and the anxiety types of the psychoneuroses. In Göttingen, too, he began his epoch-making investigations into colour vision. These he continued on his return to England in 1900 when for two years he occupied a house at Haslemere, equipping two of its attic rooms as a laboratory.

It was during this period and a few years later that McDougall carried out his most important experimental work and, in the view of many, the most enduring of his many valuable contributions to psychology. He published his observations and conclusions on colour vision in a series of papers which appeared in 1901 in *Mind*, and in 1904 in the *British Journal of Psychology*. He contributed articles also to *Brain* in 1901 and 1903 on the seat of the psycho-physical processes and on the nature of inhibitory processes within the nervous system. Many of his views on these and cognate subjects were incorporated in a "Primer of Physiological Psychology" published by him in 1905; they involved the hypothesis of a general fund of nervous energy, which was drained owing to synaptic resistance from areas of inhibition to those of excitation, and passed from afferent neurones of high potential to motor neurones of lower potential.

In 1902, after having at the request of James Sully begun to teach experimental psychology at University College, London, McDougall was appointed reader there in this subject. He continued to hold this post for a few years after 1903 when, in succession to G. F. Stout, he became Wilde reader in mental philosophy in the University of Oxford. He was elected to a fellowship at Corpus Christi, but throughout his life at Oxford the conditions there did not make for happiness: neither philosophers nor scientists were willing to accept the subject as one suited for undergraduate teaching in their respective faculties. In 1908 he published his "Introduction to Social Psychology," a work which has now passed through twenty-three editions and has been translated into many languages throughout the world. This he regarded as his most original contribution to psychology; it was designed to prepare the way for a fuller treatise on the subject, "The Group Mind" (1920). It was based on the view that instincts are the driving forces—the functional units—of mental life, that intelligence serves essentially to direct them, and that instinctive movements and emotional experience are but objective and subjective aspects of the same function. He developed in modified form the impor-

tant views of Alexander Shand, published in *Mind* in 1896, concerning the derivation of the sentiments from various emotions organised about an object. In 1911 his book on "Body and Mind" appeared. Its sub-title, "a history and defence of animism," sufficiently indicates its author's views; throughout his life McDougall was an ardent upholder of the hypothesis of independent interaction between mind and body.

In the first year of the late war McDougall drove an ambulance in France for the French Army. In 1915 he joined the R.A.M.C. and, with the ultimate rank of major, was employed in treating cases mainly of shell-shock and psychoneurosis at Netley. The experiences thus gained and the views which he came thus to form were embodied in "An Outline of Abnormal Psychology" (1926). Shortly before the war he had ventured, against the terms of the foundation of his readership, to establish a small psychological laboratory at Oxford; but on his return there to University work after the war, he found that the accommodation with which he had been provided was needed for other purposes. In 1920 he was offered the chair of psychology at Harvard University, in succession to H. Münsterberg. Disappointed with his treatment and with future prospects at Oxford, and attracted by the freedom of a live and developing new country both for himself and for his young family, he decided to accept the post. Here however he was fated to meet once again with disappointment. This was no doubt mainly due to two reasons. In his early days, McDougall had stressed the behaviour-aspect of psychology; indeed in 1912 he had published in the Home University series a small volume which he entitled "Psychology: the study of behaviour." But by 1920 "behaviourism" was running riot in the United States, and McDougall had come to define psychology not as the science of human behaviour but as the science of the human mind. He began to stress the purposive, goal-seeking character of behaviour, the impossibility of accounting for the bodily and mental activities of living organisms solely in mechanical terms, and the need for a "hormic" psychology. These views he embodied in his "Outline of Psychology" (1923) and in "The Energies of Man" (1932) wherein he usefully combined the most important contents of the former book and of his "Outline of Abnormal Psychology."

McDougall did not hesitate to say what he thought, both in lectures and in published books, about the defects and dangers of American civilisation. Following the delivery of his Lowell lectures, published in America under the title of "Is America Safe for Democracy?" and in this country under that of "National Welfare and National Decay" (1921), he published in 1926 "The American Nation: its problems and psychology," in which he deplored the corruption practised in political positions, the gains expected from them, and the absence of a leisured class, members of which would devote themselves solely to social service. So it was that in 1927 he accepted the chair of psychology in the richly endowed Duke University of North Carolina which had attractions, both material and non-material, to offer. Here he remained until his death, spending during recent years one half of each year in England. While he was at Harvard he had begun an experiment on the breeding and training of successive generations of rats, in order to ascertain (and, as he believed, finally to prove) the truth of the Lamarckian view of the inheritance of acquired characters. Helped at some stages by his son and by other students, he experimented on over 30 generations of rats, but his results have since failed to receive corroboration at the hands of F. A. E. Crew in this country. At Duke University he also took an active interest in the work of his colleague, J. B. Rhine, on "super-sensory perception." He considered that these experiments placed telepathy on a firmer scientific basis, but their repetition in this country has so far not provided corroborating evidence.

His belief in telepathy was related to his interest in the British and American Societies of Psychical Research, in each of which he filled the office of president. It is also reflected in the hypothesis of the conscious self which he advanced in his "Outline of Abnormal Psychology," regarding it as a dominant monad amid a hierarchy of subordinate monads which were telepathically connected with the principal monad. He ascribed multiple personality to the insubordination of one or more of the subsidiary monads. On the other hand, McDougall was highly critical of psycho-analysis. In 1920 he visited Jung at Zürich and was psycho-analysed by him. In 1936 he expressed his criticisms in "Psycho-analysis and Social Psychology." His interests and activities in the psychological aspects of social and evolutionary problems were predominant throughout the latter years of his life. Between 1924 and 1935 he published six other volumes on these subjects, and only shortly before his death another volume, showing vast reading and critical thought, written in his characteristically clear and vigorous style, entitled "The Riddle of Life." The book was completed on the day before his first operation.

This is the plain story of a life of remarkable vigour, usefulness, and devotion to psychology. Of the man himself little remains to be said. He was almost worshipped by his pupils, among whom may be mentioned William Brown, Cyril Burt, J. C. Flugel, and May Smith. His massive leonine face, his deep voice, his athletic figure and pride of body, his self-confidence and independence, and, above all, his exceptional mental powers marked him out as a man of outstanding personality. But he was a disappointed man and he made few friends. He has indeed described himself as "domineering" and "uncompromisingly arrogant." He has also said that he always found it difficult to believe in the value of his work, and that the more he wrote, the more antagonism he seemed to provoke. He may not have obtained all the reward and praise which his unusual ambition led him to expect. But the value of his work has not been surpassed by any psychologist of recent years.

HUGH DAVIES-COLLEY, O.B.E., B.Chir. Camb., F.R.C.S.

Mr. Hugh Davies-Colley, who died at Frensham, Surrey, on Nov. 18th at the age of 62, had been responsible for the surgical care of much of the Aldershot Command since 1915. He came of a family of surgeons, for his father, John Davies-Colley, was surgeon to Guy's Hospital, his younger brother is now a surgeon there, and his sister was the first woman to become a fellow of the Royal College of Surgeons. He was educated at Westminster School and Trinity College, Cambridge, and did his clinical work at Guy's. He obtained his fellowship in 1904, but it was the European war that really discovered him as a surgeon. He was appointed to the staff of the Cambridge Military Hospital at Aldershot at a time when Sir Arbuthnot Lane was reorganising the medical and surgical arrangements of the Command. At first he was allotted the genito-urinary department, and to many his name will

conjure up memories of a kindly, indefatigable, and, in those days, bearded figure wandering along a corridor at any hour of the day or night, armed with his "periscope." He ultimately became chief surgeon to this large hospital, a position that he held until his death.

NOEL DEAN BARDSWELL, M.V.O., M.D. Edin., F.R.C.P.

Dr. Noel Bardswell died at Cheam on Dec. 1st at the age of 66. His name will be held in grateful remembrance by all who have shared in the campaign against tuberculosis, for he was a pioneer in rational sanatorium treatment, he was responsible for the tuberculosis service in London for nearly twenty years, and after official retirement he turned his inquiring mind to the spread of tuberculosis in a Crown colony.

Noel Dean Bardswell was the second son of Charles William Bardswell, recorder of Kingston-on-Thames, and he was born there in 1871. From Sherborne he went to Edinburgh University and later to Guy's Hospital for his clinical work. He qualified in 1895. Soon afterwards he ran a sixpenny dispensary off the Old Kent-road for a year, where he lived *en famille* with a junior clerk of the local railway goods yard; it was there that his interest in sociology and the poorer classes was first aroused. While reading for his M.R.C.P. he went as house physician to Sheffield Royal Infirmary. He then became interested in the hygienic-dietetic treatment of tuberculosis as practised at Nordrach, and he persuaded the medical staff to set aside a small ward and a shelter in the hospital grounds to investigate it. After he left Sheffield he pursued this interest at University College, London, in association with F. W. Goodbody and J. E. Chapman. His work at Sheffield led to his selection in 1901 as second physician at David Lawson's new sanatorium on Dee-side. Here he laid the foundation of his expert knowledge of tuberculosis and decided to specialise. In 1902 he took over Mundesley Sanatorium from F. W. Burton-Fanning. At that time there was hardly any provision for the sanatorium treatment of working-class patients, and Bardswell rented a house where he treated poor people at nominal fees. At Mundesley he examined the effect of diet in tuberculosis with an enthusiasm that some mistook for ruthlessness, for he did not hesitate in the interests of science to feed patients for weeks, it might be, on a diet of beans or peas. This spartan treatment however evoked no complaint from patients, who did not miss the kindly physician in the experimenter. In 1905 he was made first medical superintendent of the new King Edward VII Sanatorium at Midhurst; in 1912 he served on the Astor departmental committee, where his opinions added much to the value of their report; and in 1915 he was awarded the Weber-Parkes prize and medal of the Royal College of Physicians. During the war he served as major with the R.A.M.C.

In 1917 Bardswell left Midhurst to advise the London Insurance Committee on the residential treatment of tuberculosis under the National Insurance Acts. The story of his appointment may be told in his own words. "When I was up for the L.I.C. job," he said, "one of the committee of working men and insurance officials said to me 'We know you come from a royal sanatorium and treating the fairly well to do; I would like to know what contact you have ever had with my class—the working-class.' When I gave him my Old Kent-road experience, the committee looked at me in blank amazement. Then there was a chorus of approval—and so I came to London." The best method of using the meagre funds available required careful judgment, and an intimate knowledge of both the clinical and social sides of the disease. In 1921 he carried out an investigation into the after-histories of the committee's tuberculous patients, and his findings had an important bearing on the arrangements later made by the L.C.C. for residential treatment. In the same year the administration of sanatorium benefit was transferred to the L.C.C., and Bardswell became a principal assistant medical officer to the Council. The success of the transfer was largely due to his tactful guidance. Under the Council he acquired a wide knowledge of sanatorium conditions in the South of England, and he was instrumental in raising the standard of treatment at many of the institutions that he visited. His reports on problems connected with the London tuberculosis service were lucid and arresting. He was an apt clinician and tended to rely more on physical examination and experience than on the more modern aids to diagnosis. His rather casual manner and his neglect of personal appearance sometimes misled those who met him for the first time, but his colleagues and his patients soon recognised his worth and came under the spell of his personality.

Two years ago Bardswell went out to Cyprus for the National Association for the Prevention of Tuberculosis to investigate the alleged high incidence and rapid spread of the disease in the island. His inquiry was made more difficult by the Cypriot's terror of tuberculosis and natural tendency to exaggeration, and by the lack of transport facilities. By the exercise of diplomacy—he avoided all painful tests and apparatus that might cause alarm—he was able to make a thorough survey and to assure the authorities that the position was no worse than in other comparable districts. His interim report, which throws much light on the Cypriot as a man as well as a patient, was published early this year, and his final report is now awaiting publication. In Cyprus, too, he and his wife had every opportunity of indulging their interest in archæology.

In 1907 Dr. Bardswell married Monica, daughter of John Mack, of Paston Hall, Norfolk, and he leaves a widow, two sons, and two daughters.

FRANCIS WOODCOCK GOODBODY, M.D. Dubl., M.R.C.P.

Dr. Goodbody died in London on Nov. 30th after a long illness. He was the son of Marcus Goodbody of Clara, King's co., and Black Rock, co. Dublin, and was born in 1870. As a schoolboy he was sent to Brighton College, but he returned to Trinity College, Dublin, for his university studies. Graduating in medicine in 1894 he worked at the Meath Hospital

and then successively in London, Zürich, and Breslau. In 1897 he entered University College, London, as assistant professor of pathological chemistry—a post which he held until in 1919 he became lecturer in medical chemistry in the chemical department. His early researches covered a variety of subjects on the borderline of chemistry and medicine: he wrote on intestinal antiseptics, the solution of uric acid salts in the body, protein metabolism, metabolism in phthisis, and the influence of salicylates on metabolism. In his metabolic work he collaborated with Dr. Chapman and Dr. Bardswell, and with Prof. Vaughan Harley, whose brother-in-law he became. With Harley he was part author of a book "Chemical Investigation of Gastric and Intestinal Diseases by the Aid of Test Meals," published in 1906. He also wrote, with Dr. H. D. Singer and Sir Kenneth Goadby respectively, on familial periodic paralysis and on lead poisoning.

During the late war Goodbody received a captain's commission in the Royal Army Medical Corps, being attached to the Artists' Rifles, and in 1918 and 1919 he served as acting commissioner of medical services (Irish region) in the Ministry of National Service. He was interested in administration, as was evident in his excellent work as treasurer and president of the students' union at University College, and in the later years of his life his leisure was freely given to the affairs of the British Medical Association, in which he held local office as early as 1912.

"There can be no one who has frequented the working committees and councils of the Association" writes Mr. Bishop Harman, "who will not know of the quiet, unassuming work of Francis Goodbody; and who will therefore not fail to miss him. At the meetings of the representative body, of the central council, and of the more local London branch council and the Marylebone division he was a constant attendant, or indeed an officer of some of these councils. His quiet, genial manner impressed and endeared him to everyone. The easy and placable style of his speech, the simplicity with which he was accustomed to put forward his arguments in favour of the proposition in which he was interested, made him a friend even of those with whom he might be in opposition on some particular matter. With that habitual friendly manner there was combined a level-headed common-sense attitude to medical problems and affairs. So that his influence in the councils of the Association was greatly regarded by his colleagues.

"Perhaps the most important piece of work he did for the Association and his professional colleague, and certainly the most difficult, was through his chairmanship of the naval and military committee. For many years he worked assiduously at this most difficult task. He made himself a master of the intricate service regulations, whether these related to the work, the pay, the promotion, or the retirement of service members. In his interview with the service chiefs at the Government departments he was always able to put the case well and truly by the exactness of his knowledge, and the fair and balanced method of his presentation of the case. When he retired from the office of chairman of that committee a few years ago, the united thanks of his colleagues made it plain how greatly they valued his work, and truly he had earned their thanks. There are few men who are habitually engaged in civil practice who are able to become recognised by service members as masters of their special conditions. Goodbody did that.

"The last piece of work, and piece of simple diplomacy, he did for the Association was at this year's annual meeting at Plymouth. Some of us knew then that his health had not been good of late, but none thought that he would so soon cease to be a participant in the work that he had loved."

Dr. Goodbody married in 1901 Olga, daughter of the late Dr. George Harley, F.R.S. She died in 1936 and they leave a son and a daughter.

DR. WILLIAM JOHN CROPLEY SWIFT, who has just died at Newquay, Cornwall, in his 86th year, was associated all his life with the Foundling Hospital. He became its assistant medical officer in 1877, three years after qualifying, principal medical officer fifteen years later, and after his retirement a governor of the hospital. Dr. Swift, who was born near Ely in 1853, was a cousin of John Marshall, F.R.S., surgeon to University College Hospital, where he completed his medical study after apprenticeship to Robert Muriel, surgeon, and Dr. Sinclair of Ely. While his chief interest was in children, he took up skin diseases as a specialty.

MEDICAL NEWS

University of Cambridge

Sir Edward Mellanby, F.R.S., has been appointed Rede lecturer for 1939.

Mr. G. Stead has resigned his university lectureship in physics as applied to medical radiology and electrology. As the diploma in this subject is not to be granted after 1941 a new lecturer has not been appointed, and arrangements have been made for all teaching for the D.M.R.E. to be done in London during the next three years. The examinations will continue to be held in Cambridge till 1941.

University of Bristol

The dissertation of C. H. G. Price has been approved for the degree of M.D.

Royal Faculty of Physicians and Surgeons of Glasgow

At a meeting of the faculty held on Dec. 5th, with Dr. John Henderson, the president, in the chair, the following were admitted to the fellowship:—

*Duncan McCallum Blair, M.B., F.R.S.E. (Glasgow); *John William McNee, M.D., F.R.C.P. (Glasgow); Prem Datta Bhargava, M.B., D.T.M. & H. (Edinburgh); Hugh Cameron McLaren, M.B. (Aberdeen); Nau Nihal Singh, M.B., D.T.M. (London); Thomas Ferguson Stewart, M.B. (Bearsden); and John Wilson, M.B. (Buckhaven).

* Under chapter III of the regulations.

Royal College of Physicians of Edinburgh

The annual meeting of the college was held on Dec. 1st, when Dr. Alexander Goodall was re-elected president. Dr. Edwin Bramwell, Dr. John D. Comrie, Prof. Charles McNeil, Dr. A. Fergus Hewat, Dr. D. M. Lyon, and Dr. A. Graham Ritchie were elected members of the council. Dr. Comrie was nominated vice-president.

The honorary fellowship of the college was conferred on Sir Charles Blackburn, first president of the Royal Australasian College of Physicians.

Welsh National School of Medicine

At recent examinations the following candidates were successful:—

Surgery.—G. C. D. Evans and Ronald Tipple.

Post-graduate Course in Venereal Diseases

During January, February, and March, at the London County Council (Whitechapel) Clinic, Turner-street, E., Lieut.-Colonel E. T. Burke will give a course of instruction in modern methods in the diagnosis and treatment of venereal disease. Lectures will be given on Mondays and Thursdays at 2.30 P.M. beginning on Jan. 3rd, and on Wednesdays at 2 P.M. there will be case demonstrations. Further information may be had from the director of the clinic.

Pharmaceutical Society of Great Britain

A meeting of this society will be held at 17, Bloomsbury-square, London, W.C., on Tuesday, Dec. 13th, when Mr. W. G. Templeman will deliver a lecture on plant growth hormones and their uses.

Epsom College: St. Anne's Scholarships

The council of Epsom College will shortly award several St. Anne's scholarships for girls. Candidates must be fully nine years of age, and must be orphan daughters of medical men who have been in independent practice in England or Wales for not less than five years. Application must be made by Jan. 1st on a form to be obtained from the secretary of the college, 49, Bedford-square, London, W.C.1.

British Institute of Philosophy

A meeting of this society will be held at University College, Gower-street, London, W.C., at 8.15 P.M. on Tuesday, Dec. 13th, when Prof. H. F. Hallett, D.Litt., will speak on Things in Themselves. Cards of admission can be had from the director of studies at University Hall, 14, Gordon-square, London, W.C.1.

Course in Psychological Medicine

Lectures and practical instruction for those preparing for a diploma in psychological medicine will be given at the Maudsley Hospital from January to May, 1939. Further information may be had from Prof. F. Golla, hon. director of the medical school, the Maudsley Hospital, London, S.E.5.

Harveian Society of London

To-day, Friday, Dec. 9th, at 8.30 P.M., Sir Alfred Webb-Johnson will deliver his presidential address to this society. His subject will be the history of surgery in London. The meeting will take place at Manson House, 26, Portland-place, W.

Bernhard Baron Trust

On Dec. 5th grants amounting to £43,000 were made from this trust to various hospitals and charities. The grants included £16,335 to London hospitals and £10,290 to hospitals outside London. Under the terms of the trust they are made every year on the late Mr. Baron's birthday. Since the formation of the trust ten years ago over £428,000 has been distributed.

Irish Medical Schools and Graduates Association

The annual autumn meeting of this association was held at the Rembrandt Hotel on Dec. 1st, when the president, Mr. Johnston Abraham, and Mrs. Johnston Abraham received the guests. Lieut.-General W. P. MacArthur, director-general of Army Medical Services, received on behalf of Captain J. W. Orr, R.A.M.C., the Arnott memorial medal which was awarded by the society to Captain Orr for bravery under fire on the Indian Frontier. Sir William Wheeler proposed the toast of The Guests, to which Lord Stopford replied. Canon Hannay (George A. Birmingham) proposed the toast of The Association and referred to the literary gifts of the president. After dinner there was a dance which was enjoyed by the members, their wives, families, and guests.

Ella Sachs Plotz Foundation

The trustees of this foundation are anxious to make known the resources of their fund for the advancement of scientific investigation. The foundation seldom or never offers stipends to investigators; nor does it provide apparatus and materials which are ordinarily part of laboratory equipment. Its special purpose is to give grants for the purchase of apparatus and supplies required for special investigations and for the payment of unusual expenses, including technical assistance. The research should bear closely on medicine or surgery, and the maximum size of grants will usually be less than $500. In the fifteen years of its existence the foundation has made 340 grants and investigators have been aided in 34 countries. Applications for assistance should arrive before April, including statements about the nature of the investigation, the amount of money wanted, and the way in which it will be spent. The secretary of the executive committee is Dr. Joseph C. Aub, Collis P. Huntington Memorial Hospital, 695, Huntington-avenue, Boston, Massachusetts, U.S.A.

Royal Sanitary Institute

The Henry Saxon Snell prize, which was founded to encourage improvements in the construction or adaptation of sanitary appliances, will be awarded by the council of the institute in 1939 for an essay describing constructive suggestions for improvements in sanitary appliances. The prize will consist of fifty guineas and a silver medal. Further information may be had from the secretary of the institute, 90, Buckingham Palace-road, London, S.W.1.

Inter-relationship of the Health Services

At a rotary vocational group of London doctors, dentists, and pharmacists held on Dec. 1st at St. Ermin's Restaurant, Mr. H. N. Linstead, secretary and registrar of the Pharmaceutical Society, suggested the setting up of some simple form of consultative machinery representative of the three professions, which might join in measures directed against unfair competition by the unqualified and in support of legislation designed to safeguard titles and professional practice. They might then jointly approach the Minister of Health on matters of national health insurance and the local authorities which were likely to play an increasing part in the health services. There was, he felt, an opportunity for medicine to take her rightful place as the leader, adviser and, if need be, protector in their early years of her sister professions.

Smoke

Dr. H. A. Des Voeux presided over the tenth annual conference of the National Smoke Abatement Society held in Cardiff on Dec. 2nd and 3rd. Dr. J. Greenwood Wilson said he thought it a misfortune that in the new Public Health Act the method of dealing with smoke abatement by the old "nuisance" procedure should be perpetuated. He also called for a definition of smoke. There were high standards of purity for water, low standards for milk, but none at all for air. "We are faced with the sad spectacle of trained technical officers, who in the host of their duties might be so much more usefully employed, sitting watching smoke come from factory chimneys for half-hours on end. Can anyone of intelligence pretend that in these activities based upon smoke by-laws you have a legally recognised application of scientific standards comparable with that appertaining to milk and water?" Mr. S. N. Duguid spoke of the need for training stokers. "A boiler fireman," he said, "can only be considered fully trained when he can go to any boiler plant, burning any type of fuel, and operate it efficiently and without creating a smoke nuisance. To produce men of this grade a course of at least forty lectures is necessary." Mr. Thomas Dixon pointed out that Cardiff, the largest coal port in the world, was one of the cleanest towns in Britain, the reason being that the local coals emitted very little smoke. South Wales smokeless coals, however, could be burned efficiently and smokelessly in any modern fireplace. Mr. W. Clark Jackson said that last year South Wales gas undertakings converted over 300,000 tons of coal into gas and smokeless fuel and thereby saved Wales from a sootfall of nearly 50,000 tons. Mr. James Smith described methods by which smoke and grit could be prevented from leaving the chimneys of power stations, which instead emitted only a light blue haze. Colonel A. W. Bristow said that when a ton of coal had yielded 14 cwt. of smokeless fuel there remained valuable secondary by-products of diesel oil or petrol, tar, acids with valuable antiseptic and germicidal properties, raw material for the plastic industry, dyestuffs, explosives, and a wide range of chemicals.

Dr. Des Voeux, in his presidential address, said that towns have become places where life in the Greek sense is impossible. Those people who are fortunate enough to have ample leisure spend it in the country, and the town-dweller is perforce an escapist. "Towns should be able to provide all the necessary amenities, and make the agonised exodus that marks the week-end and turns roads into caterpillar extensions of towns unnecessary. . . . More than two thousand years ago men conceived the idea that life in towns was the highest form of life, and that idea has developed into a realism in its extreme form, and in our large cities into a horrid and foul reality of dirt and sunlessness."

L.C.C. and the Milk Industry Bill

On Tuesday, at the suggestion of its general purposes committee, the Council expressed its opinion that nothing in the Milk Industry Bill should prevent local authorities from obtaining supplies of milk, in wholesale or semi-wholesale quantities and not for resale, from producers through the agency of the Milk Marketing Board, at prices arranged independently of any price control to be exercised by distributors' boards.

Brighton and Sussex Medico-Chirurgical Society

At an extraordinary meeting of the council held on Oct. 19th Mr. Douglas A. Crow was elected president to fill the vacancy caused by the death of Dr. J. G. Hayes. On Nov. 3rd Dr. H. G. McGregor read a paper entitled Constitution. On Dec. 1st Mr. Crow delivered his presidential address entitled A Blind Man With a Lantern.

Medical Research Council of Ireland

It is announced that whole-time research grants have been made to the following: Mr. P. J. Boyle, M.Sc. (effect of the potassium ion on the kidney, and development of a micro method for the estimation of glucose); Mr. T. G. Brady, M.Sc. (occurrence of vegetable adenylic acid in plasma and tissues); Dr. O. T. D. Loughnan (heparin in the treatment of established thrombosis); and Dr. D. K. O'Donovan (specific metabolic principle of the pituitary gland). A part-time research grant has been made to Miss Emily J. Power Steele, M.Sc. (the degree of visual dysaptation resulting from a deficiency in vitamin A); and grants-in-aid to Dr. Gerald FitzGerald, to Prof. J. Brontë Gatenby, D.Sc., and Miss Olive Aykroyd, and to Dr. Earl McCarthy. Mr. R. P. Cooke, M.Sc., Dr. Oliver FitzGerald, Dr. Ninian Falkiner, Dr. Cecil Mushatt, and Dr. T. C. J. O'Connell have had their grants renewed.

Chelsea Clinical Society

The annual dinner of this society, held at the Rembrandt Hotel on Tuesday last, was attended by a large gathering of members and guests who were received by the president, Mr. Duncan Fitzwilliams. The toast of the Chelsea Clinical Society was given by Sir Eric Maclagan, curator of the Victoria and Albert Museum and nephew of the late Sir Douglas Maclagan, professor of medical jurisprudence in the University of Edinburgh. His amusing speech included reminiscences of his uncle. The president, in reply, gave an interesting account of the history of Chelsea and its medical associations. He expressed appreciation of the valuable work of the honorary secretaries, Mr. Andrew Rugg-Gunn and Mr. H. P. Baylis, and of the honorary treasurer, Dr. Kenneth Eckenstein. The toast of The Guests was proposed by the honorary treasurer, and replied to by the honorary treasurer of the Royal Society of Medicine (Mr. C. W. Gordon Bryan), both of whom provided the company with topical anecdotes.

Medical Diary

Dec. 12th to Dec. 17th

SOCIETIES

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.

MONDAY.

United Services. 4.30 P.M., Air Commodore H. E. Whittingham: Preventive Medicine in Relation to Aviation. (Presidential address.)

TUESDAY.

Therapeutics and Pharmacology. 5 P.M., Dr. S. Levy Simpson, Dr. J. F. Wilkinson, Dr. H. P. Himsworth, and Dr. F. Avery Jones: Recent Developments in the Treatment of Addison's Disease.

Psychiatry. 8.30 P.M., Dr. J. E. Nicole: Recent Trends in Psychiatry.

FRIDAY.

Physical Medicine. 4.30 P.M., Dr. A. H. Douthwaite: Manipulation in Rheumatic Disorders. Mr. A. S. Wesson will also speak.

Neurology. 5 P.M., Dr. Gordon Holmes, F.R.S.: The Cerebellum of Man. (Hughlings Jackson lecture.)

MEDICAL SOCIETY OF LONDON, 11, Chandos-street, W.

MONDAY.—8.30 P.M., Mr. E. Pearce Gould and Mr. J. Swift Joly: Preliminary Investigation on Cases of Malignant Disease of the Breast and Urinary Bladder.

NORTH LONDON MEDICAL AND CHIRURGICAL SOCIETY.

WEDNESDAY.—9 P.M. (Royal Northern Hospital, Holloway-road), Dr. K. J. Yeo: radiological demonstration.

PADDINGTON MEDICAL SOCIETY.

TUESDAY.—9 P.M. (St. Mary's Hospital medical school), Dr. W. F. Christie: Obesity.

SOUTH-WEST LONDON MEDICAL SOCIETY.

WEDNESDAY.—9 P.M. (Bolingbroke Hospital, Wandsworth Common), Mr. Gavin Livingstone: An American Interlude.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's Inn-fields, W.C.

THURSDAY.—5 P.M., Sir Humphry Rolleston: The Early History of Morbid Anatomy in England. (Thomas Vicary lecture.)

CHADWICK LECTURE.

TUESDAY.—5.30 P.M. (London School of Hygiene, Keppel-street, W.C.), Dr. Leonard Colebrook: The Control of Puerperal Fever.

BRITISH POSTGRADUATE MEDICAL SCHOOL, Ducane-road, W.

TUESDAY.—4.30 P.M., Prof. E. Mapother: Medical Psychology.

WEDNESDAY.—Noon, clinical and pathological conference (medical). 2 P.M., Mr. E. J. King, Ph.D.: Calcium-phosphorus Metabolism. 3 P.M., clinical and pathological conference (surgical). 4.30 P.M., Sir Henry Dale, F.R.S.: Chemical Transmission of Nerve Impulses.

THURSDAY.—2.15 P.M., Dr. Duncan White: radiological demonstration. 3.30 P.M., Prof. J. Chassar Moir: Breech Cases.

FRIDAY.—2 P.M., clinical and pathological conference (obstetrics and gynæcology). 2.30 P.M., Mr. Clifford Morson: Surgery of the Prostate.

Daily 10 A.M. to 4 P.M., medical clinics, surgical clinics and operations, obstetrical and gynæcological clinics and operations.

INSTITUTE OF PSYCHO-ANALYSIS, 96, Gloucester-place, W.

TUESDAY.—8.30 P.M., Dr. Kate Friedlander: Obsessional Neurosis.

HAMPSTEAD GENERAL AND NORTH-WEST LONDON HOSPITAL, N.W.

WEDNESDAY.—4 P.M., Dr. Izod Bennett: Renal Failure.

HOSPITAL FOR SICK CHILDREN, Great Ormond-street, W.C.

THURSDAY.—2 P.M., Dr. W. G. Wyllie: Acute Aseptic Meningitis. 3 P.M., Mr. A. Simpson-Smith: The Surgery of the Small Intestine.

Out-patient clinics daily at 10 A.M. and ward visits at 2 P.M.

CENTRAL LONDON THROAT, NOSE, AND EAR HOSPITAL, Gray's Inn-road, W.C.

FRIDAY.—4 P.M., Mr. W. G. Scott-Brown: Deaf Mutism.

ST. JOHN CLINIC AND INSTITUTE OF PHYSICAL MEDICINE, Ranelagh-road, S.W.

FRIDAY.—3.30 P.M., Dr. G. T. Calthrop: Radiology in the Rheumatic Diseases.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, London, W.

MONDAY to SATURDAY.—WEST END HOSPITAL FOR NERVOUS DISEASES, Welbeck-street, W., afternoon course in neurology.—HOSPITAL FOR DISEASES OF THE SKIN, Blackfriars-road, S.E., afternoon course in dermatology.

SOUTH-WEST LONDON POST-GRADUATE ASSOCIATION.

WEDNESDAY.—4 P.M., Mr. R. L. Dodds: antenatal cases.

LEEDS GENERAL INFIRMARY.

TUESDAY.—3.30 P.M., Mr. H. W. Symons: Tumours of the Bladder.

LEEDS PUBLIC DISPENSARY.

WEDNESDAY.—4 P.M., Mr. A. Gough: Minor Gynæcological Troubles.

GLASGOW POST-GRADUATE MEDICAL ASSOCIATION.

WEDNESDAY.—4.15 P.M. (Victoria Infirmary), Dr. Angus Scott: medical cases.

Appointments

BELL, DOYNE, D.M. Oxon, M.R.C.P., Consulting Physician for Diseases of Children to the King Edward Memorial Hospital, Ealing.

BENTLEY, F. H., M.B. Manch., F.R.C.S., Hon. Surgeon to the General Hospital, Altrincham.

COOKE, C. J. CHESTERFIELD, M.R.C.S., D.M.R.E., Hon. Assistant Radiologist to the Royal Surrey County Hospital, Guildford.

CRIDLAND, NIGEL, B.M. Oxon, D.O., Hon. Ophthalmic Surgeon to the Royal West Sussex Hospital, Chichester.

DAVIES, H. NOEL, B.M. Oxon, Second Assistant Hon. Anæsthetist to the Royal Hampshire County Hospital, Winchester.

DUNN, WILLIAM, M.B. Durh., Assistant Medical Officer at the Durham County Mental Hospital, Winterton.

ELLIS, N. GWYNETH, M.B. Lond., Assistant Medical Officer of Health for Swansea.

HARMAN, J. BISHOP, M.D. Camb., M.R.C.P., F.R.C.S., Consulting Physician to the King Edward Memorial Hospital, Ealing.

MCMECHAN, E. W., M.B. Belf., F.R.C.S., House Surgeon at St. Mark's Hospital, London.

PEDEN, W. J., L.R.C.P.I., D.P.H., Resident Medical Officer at Hill House Infectious Diseases Hospital, Swansea.
THOMPSON, H. R., M.B. Camb., F.R.C.S., Resident Surgical Officer at St. Mark's Hospital, London.
WESSON, A. W., M.D. Lond., M.R.C.P., F.R.C.S., Hon. Physician in charge of the physiotherapy department of the Royal Surrey County Hospital, Guildford.

Royal Free Hospital.—The following appointments are announced:—
HANCOCK, P. E. THOMPSON, M.B. Camb., M.R.C.P., Assistant Physician;
SHIPPAM, EVERELL M., M.D. Lond., Senior Assistant to the obstetrical and gynæcological unit;
MAYEUR, MARY H., M.D. Lond., M.C.O.G., Second Assistant to the unit; and
BURTON, MARGARET, M.R.C.S., Third Assistant to the unit.

Medical Referee under the Workmen's Compensation Act, 1925: Dr. D. B. Low, of Perth, for the Perth Sheriff Court District (Sheriffdom of Perth and Angus).

Vacancies

For further information refer to the advertisement columns

Aylesbury, Royal Buckinghamshire Hosp.—Sen. and Jun. Res. M.O.'s, at rate of £200 and £150 respectively.
Bermondsey Borough.—Asst. M.O. for Maternity and Child Welfare, £600.
Birkenhead, Clatterbridge Isolation Hosp.—Res. Asst. M.O., £200.
Birmingham Infirmary.—Asst. Res. M.O., £350.
Birmingham United Hosp.—Asst. to Radiological Dept., £400–£450. Also Res. Anæsthetist, £70.
Board of Control, Hobart House, Grosvenor-square, S.W.—Commissioner, £850.
Bolton Royal Infirmary.—Asst. Pathologist, £600.
Cambridge, Addenbrooke's Hosp.—H.S. and H.P., each at rate of £130.
Central London Ophthalmic Hosp., Judd-street, W.C.—Locum for Sen. H.S.
Charing Cross Hosp.—Hon. Clin. Asst. to X Ray, &c., Depts., £50.
Colchester, Severalls Mental Hosp.—Med. Supt., £1100.
Croydon General Hosp.—Cas. H.S., £125.
Dundee Mental Hosp.—Jun. Asst. M.O., £300.
Ealing Borough.—Asst. M.O.H., £600. Also Asst. M.O., £450.
East Ham Memorial Hosp., Shrewsbury-road, E.—H.S. and Cas. O., at rate of £120. Refractionist, £65. Also Hon. Radiologist.
Farnham County Hosp., Hale-road.—Asst. M.O., £350.
Glasgow Victoria Infirmary.—Visiting Anæsthetist, £400.
Guy's Hosp. Dental School, S.E.—Dental Research Fellow, £400.
Halifax Royal Infirmary.—Second and Third H.S.'s., at rate of £175 and £150 respectively.
Hampshire County Council.—Asst. County M.O., £600.
Hastings, Royal East Sussex Hosp.—Sen. H.S., at rate of £200.
Hosp. for Consumption and Diseases of the Chest, Brompton, S.W.—Asst. Physicians.
Hosp. for Diseases of the Skin, Blackfriars.—Additional Member for Hon. Staff.
Hosp. for Sick Children, Great Ormond-street, W.C.—Out-patient M.O., £150, and Out-patient Aural Registrar, £175.
Hosp. of St. John and St. Elizabeth, 60, Grove End-road, N.W.—Res. H.P., at rate of £100.
Hounslow Hosp., Staines-road.—H.P. and Cas. O., at rate of £100.
Hull Royal Infirmary.—Second Cas. O., at rate of £150.
Ilford, King George Hosp.—Asst. Cas. O. and H.S. to Spec. Depts., at rate of £100.
Ilford, West Ham Hosp. for Nervous and Mental Disorders.—Jun. Asst. M.O., £350.
Ilford Borough.—Temp. Asst. M.O.H. (Part-time) for Air-Raid Precautions, at rate of £300.
Isleworth and Heston Borough.—Asst. M.O.H. and School M.O., £500.
Kidderminster and District General Hosp.—Sen. and Jun. H.S.'s, £150 and £100 respectively.
Leeds University.—Second Surgical Tutor, £400.
Leicester Royal Infirmary.—Sen. M.O. in charge of Women's V.D. Clinics, £350.
Lincoln County Hosp.—Sen. H.S., at rate of £250
Liverpool, Broadgreen Sanatorium.—Res. Asst. M.O., £250.
Liverpool, Smithdown-road Hosp.—Res. Asst. M.O., £200.
London Chest Hosp., Victoria Park, E.—Surg. Reg., £100.
London County Council.—Part-time Obstetrician and Gynæcologist, £800. Asst. M.O., £600. Asst M.O.'s for Mental Health Service, each £470. Three Asst. District M.O.'s, £350, £212 10s. and £75. Also Temporary Visiting M.O., at rate of £150.
London Hosp. E.—First Asst. to Ophth. Dept.
Maidstone, West Kent General Hosp.—H.S., £175.
Manchester, County Mental Hosp., Prestwich.—Sen. Asst. M.O., £700. Also Locum Tenens, 7 guineas a week.
Manchester, Victoria Memorial Jewish Hosp., Cheetham.—Res. M.O., at rate of £150. Also Jun. H.S. and Cas. O., at rate of £125.
Manchester Hosp. for Consumption and Diseases of the Throat and Chest.—Asst. M.O. for Crossley Sanatorium, £200.
Manchester Royal Children's Hosp.—Res. H.S., at rate of £100.
Mansfield, Harlow Wood Orthopædic Hosp.—Two H.S.'s, each at rate of £200.
Middlesex Hosp. and Medical School, W.—Otological Reg., £300.
Newcastle-upon-Tyne, Royal Victoria Infirmary.—Med. Reg., £250.
Norwich, Norfolk and Norwich Hosp.—H.S. to Orthopædic Dept., £120.
Oldham Municipal Hosp.—Res. Asst. M.O., at rate of £200.
Plymouth, Prince of Wales's Hosp.—Hon. Asst. Surgeon.
Poplar Hosp., East India Dock-road, E.—Second Res. Officer, at rate of £175.
Preston and County of Lancaster, Queen Victoria Royal Infirmary. H.P., at rate of £150.
Princess Louise Kensington Hosp. for Children, St. Quintin-avenue, W.—Hon. Asst. Physician.
Reading, Royal Berkshire Hosp.—H.S. to Spec. Depts. and Cas. O, each at rate of £150.
Rhondda Urban District Council.—Asst. M.O., £500.
Rotherham General Hosp.—Hon. Ophth. Surgeon.
Royal Air Force.—Commissions.
Royal Cancer Hosp., Fulham-road, S.W.—Asst. Surgeon.
Royal College of Surgeons of England.—Examiner in Dental Surgery.
Royal Free Hosp., Gray's Inn-road, W.C.—Anæsthetic Reg., £150.
Royal Naval Dental Service.—Dental Officers.
Royal Naval Medical Service.—M.O.'s.
Sheffield Royal Infirmary.—Ophth. H.S., £120.
Southampton Free Eye Hosp.—Orthoptic Teacher, £180.
Southern Rhodesia Government Service.—Pathologist as Director of a Public Health Laboratory, £1000.
Staffordshire General Infirmary.—H.S., £175.
Truro, Royal Cornwall Infirmary.—Sen. H.S., £150.
University College Hosp., Gower-street, W.C.—First Asst. in Children's Dept.
Weir Hosp., Weir-road, Balham, S.W.—Jun. Res. M.O., £150.
West End Hosp. for Nervous Diseases, 73, Welbeck-street, W.—Hon. Clin. Asst.
West London Hosp., Hammersmith, W.—H.P. and Three H.S.'s, each at rate of £100.
Willesden General Hosp., Harlesden-road, N.W.—Res. Officer, at rate of £100. Also Hon. Out-patient Dept. Clin. Assts.
Wimbledon Borough.—Deputy M.O.H. and Deputy School M.O., £650.
Woolwich and District War Memorial Hosp., Shooters-hill, S.E.—Cas. O., at rate of £100.

The Chief Inspector of Factories announces vacancies for Examining Factory Surgeons at Knutsford (Chester), Stafford (Stafford), and Balfron (Stirling).

Births, Marriages, and Deaths

BIRTHS

AVELING.—On Dec. 2nd, at Colyton, Devon, the wife of Dr. A. D. Aveling—a daughter.
BEYNON.—On Dec. 5th, in Brighton, Constance Lang Beynon, M.B. Edin., the wife of Dr. John Beynon—a daughter.
CRAWFORD.—On Nov. 30th, the wife of Dr. Alex. Crawford, Great Northway, N.W.—a son.
DIMOCK.—On Dec. 2nd, the wife of Dr. J. D. Dimock, of Gloucester—a son.
GARDNER.—On Nov. 29th at Nuneaton, the wife of Dr. W. J. Gardner—a son.
GOODWILLE.—On Dec. 3rd, at Attleborough, Norfolk, the wife of Dr. George Miller Goodwille—a daughter.
LAWSON.—On Nov. 28th, at Plymouth, the wife of Surg. Lt.-Comdr. G. A. Lawson, R.N.—a son.
LEVI.—On Dec. 6th, at Woodchurch-road, N.W., the wife of Mr. David Levi, F.R.C.S.—a daughter.
LEWIS.—On Nov. 26th, to Dr. Hilda Lewis (née Stoessiger), the wife of Dr. Aubrey Lewis—a son.
MACKIE.—On Nov. 27th, at Stourport-on-Severn, the wife of Dr. Carmichael Mackie—a son.
SHARPEY-SCHAFER.—On Nov. 29th at Hammersmith Hospital, the wife of Dr. E. P. Sharpey-Schafer, of Queen's-walk, W.—a son.
WESTON.—On Nov. 25th, at Nottingham, the wife of Flight-Lt. A. M. Weston, M.B. Camb., R.A.F.—a daughter.

MARRIAGES

GLASS—MACLEOD.—On Dec. 3rd, at Chelsea Old Church, Robert Murray Glass, M.B., to Norma MacLeod, M.B.
HANCE—VON KAAN.—On Dec. 2nd, at Bombay, Lt.-Col. J. B. Hance, I.M.S., to Frau Richildis von Kaan (née von Warton).
SAVAGE—ILLINGWORTH.—On Nov. 3rd, in London, Oswald Savage, M.R.C.P., to Katharine S. Illingworth.

DEATHS

BARDSWELL.—On Dec. 1st, at Cheam, Surrey, Noel Dean Bardswell, M.V.O., M.D. Edin., F.R.C.P., aged 66.
DURRANT.—On Dec. 5th, T. Arnold Durrant, M.D. Durh., of Westbourne-terrace, W.
FAYRER.—On Dec. 2nd, at Eastbourne, Lt.-Col. Frederick Durand Stirling Fayrer, M.R.C.S. Eng., I.M.S. (retd.), aged 69.
GILLIES.—On Dec. 4th, at Edinburgh, Hugh Gillies, M.R.C.P.E., of New Abbey.
GOODBODY.—On Nov. 30th, at Whitehall-court, Francis Woodcock Goodbody, M.D. Dubl., aged 68.
GORDON.—On Dec. 3rd, at East Finchley, N., Alexander Bruce Gordon, M.D. Edin., F.R.C.S.E.
MCSHARRY.—On Dec. 3rd, John Joseph McSharry, L.R.C.P.I., of Freemasons'-road, E., aged 37.
SWIFT.—On Dec. 3rd, at Newquay, Cornwall, William John Cropley Swift, M.R.C.S., aged 85.
WADMORE.—On Nov. 27th, at Whakatane, N.Z., James Christopher Wadmore, M.R.C.S.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

NOTES, COMMENTS, AND ABSTRACTS

RESEARCH WORK AT THE ROYAL COLLEGE OF SURGEONS

THE building of new research laboratories at Lincoln's Inn-fields has seriously hampered the staff and research workers during the past year. The Buckston Browne research farm housed some of them, and the remainder worked in the physiological department of St. Bartholomew's Hospital medical college. The new laboratories have been in occupation since February. Despite all difficulties, work has progressed along a remarkable variety of paths. The most striking impression gained on reading an account of the research carried out during the year, as summarised in the Scientific Report for the year 1937–38, is that of the correlation of the clinical and experimental outlooks. It is one of the most promising developments of medicine at the present time that the younger surgeons should be taking their problems to the laboratory and personally working at them. It is in the best traditions of the great masters of surgery.

The pioneer work on lung surgery and on omental grafts in coronary disease is now being successfully applied clinically. It is easy to appreciate the significance of the observation of the director, Dr. John Beattie, that "Continued expansion in the amount of clinical work in connexion with this branch of surgery (lung surgery) is reflected somewhat in the fewer animal experiments performed during the past year." A method has been sought experimentally to produce uniform pleural adhesion without effusion. Insufflation of iodised talc powder has been successfully used in man to create adhesions between the upper lobe and the parietal pleura before performing a lower lobectomy. The successful results of omental grafting of the heart have also presented practical problems, such as the possibility of grafting without the insertion of sutures into a friable myocardium. Answers to these problems are being sought and obtained.

The causes of the profound symptoms in traumatic shock and in intestinal strangulation are of particular interest. The nervous factor has been confirmed by indirect experiments and direct observations with the cathode-ray oscillograph by two of the research workers at the Royal College of Surgeons. The parts played by toxicity of fluid exudate and by loss of fluid in the causation of the circulatory collapse in strangulation of the gut have been investigated. The explanation of the collapse has not yet been found.

An encouraging series of experiments has been carried out on homogeneous nerve-grafting in monkeys, grafts of 3–4 in. having been followed, at the end of 276 and 528 days, by complete return of motor function. The action potentials and the methods of propagation of cortical electrical activity are being studied as a preliminary to an investigation into the localisation of tumours deep in the brain substance.

Thyrotoxicosis is one of the fields in which surgery, pathology, and physiology meet. Experiments are being carried out to determine the influence of the autonomic nervous system on the activity of the thyroid gland. Other experiments aim at deciding whether post-thyroidectomy exophthalmos is produced by a pituitary hormone. Of more direct interest, perhaps, to the physician is the work on hypertension and its experimental production by occlusion of the renal arteries and on the nervous control of carbohydrate metabolism, effected through the pituitary.

Peptic ulceration is a subject on which surgeons and physicians alike would welcome enlightenment. A great deal of ground has been covered in the investigation of the nervous control of gastric secretion through the hypothalamic centres and the sympathetic and vagal innervation. So far no satisfactory method has been evolved of producing peptic ulceration in animals. Revascularisation of the kidney after vascular occlusion; the nerve-supply of the ureter; the sympathetic innervation of the adrenal gland; and the effects of anæsthesia on blood-sugar have also been investigated during the year.

The completion of a five years' investigation into the fossil human remains from Mount Carmel is also reported. These remains belong to the period which preceded the last glaciation of Europe, and their discovery has been of the greatest importance. The Swanscombe skull, found in 1935–36, has been examined by the master of the farm laboratories, Sir Arthur Keith, F.R.S. The current number of the *Journal of Anatomy* contains the results of his findings and of their application to a new reconstruction of the Piltdown skull.

It is certain that clinical medicine and surgery may expect during the next few years to be enriched by important discoveries from the work in the laboratories of the Royal College of Surgeons. The permeation of the teaching of medicine by the spirit of investigation is not the least of the results to be desired.

PAIN AS DANGER SIGNAL

IN an attempt to make the German people more health-conscious a startling contraption has been erected at the Gesundes Leben—Frohes Schaffen (healthy life—cheerful work) Exhibition in Berlin. It consists of a transparent figure of a human body some 12 ft. high placed alongside a column of light. Within the body can be seen the heart, blood-vessels, lungs, and brain. From time to time the light in the adjacent column, which is symbolic of good health, fades away; simultaneously little flames, representing pains, dart through the imitation body. As the column of light fades, so the pains become more and more vivid, and the story they are supposed to tell is that Nature's first warning of ill health is pain. Those who listen to the warning and consult their doctor may expect to regain their health; whereas those who do not will suffer more and more violent pains. To rub the lesson well in, there are neighbouring models of what may be expected by those who do not heed Nature's warning. The visitor to the Exhibition is invited to choose between calling in his doctor at once when ill or of ending up either in hospital or in the cemetery.

MASSAGE BY THE BLIND

THE capabilities of blind masseurs and masseuses no longer arouse astonishment, for in the twenty-five years since the National Institute for the Blind opened its massage school they have become an established part of the profession. In the past year there were 31 students in training at the school in Great Portland-street. An increasing number now come from Worcester and Chorleywood Colleges, the public schools for the blind. Apart from these there are ex-Service men sent by St. Dunstan's and by the Sir Beachcroft Towse fund, and men who have been blinded by industrial injuries both here and overseas. Senior students do their clinical work at the school's evening clinic and at St. George's and the Hampstead General Hospital. On qualification many students obtain appointments at hospitals and clinics but the majority set up in private practice. The Institute is able to help the latter by a grant towards preliminary expenses and by approaching doctors and local authorities on their behalf. The Eichholz clinic, which is in the same building as the school, is staffed entirely by blind masseurs and masseuses with the exception of two sighted sisters and now offers a full range of physiotherapeutic treatments. The Institute is able to report that in 1937 this clinic, like the school, has made gratifying progress.

THE COMMERCE OF DRUGS

A PUBLIC auction of drugs, the sixth and last which had been arranged to take place this year at the commercial sale rooms in Mincing-lane, has just been cancelled. Never since the days when these auctions were held at Garroway's Coffee House, and the buyer of a lot was he who made the last bid before a candle went out, has a cancellation of this kind occurred. On one or two occasions during the late war pre-arranged programmes were altered, well in advance of the advertised time, because of the uncertainty of the arrival of ships bringing goods to the Port of London, but cancellation such as last week's at two days' notice is without parallel. The custom of selling vegetable drugs arriving in bulk by sea from the world's producing centres has had its day; it has been gradually superseded by the practice of private treaty. The volume of drugs which comes to London and is cleared by buyers for the domestic market, and by purchasers who re-export the consignments bought by them, is still very large.

VACATED ITALIAN CHAIRS

ACCORDING to *Folia Medica* of Oct. 15th the following Jewish professors have been excluded from teaching in Italian medical faculties:—

Anatomy.—Tullio Terni (Padua), Giuseppe Levi (Turin).
Physiology.—Mario Camis (Bologna), Ugo Lombroso (Genoa), Carlo Foá (Milan), Camillo Artom (Palermo), Amedeo Herlizka (Turin).
Pharmacology.—Angelo Rabeno (Genoa).
Medicine.—Maurizio Ascoli (Palermo), Guido Melli (Parma).
Surgery.—Mario Donati (Milan).
Obstetrics.—Attilio Gentile (Pisa).
Pædiatrics.—Maurizio Pinker (Bologna), Vittore Zamorani (Pavia).
Forensic Medicine.—Amedeo Dalla Volta (Genoa), Leone Lattes (Pavia).
Morbid Anatomy.—Ettore Ravenna (Modena), Enrico Emilio Franco (Pisa).

A READY RECKONER

UNTIL the nations can agree to a common unit of length and volume we shall all of us at times be obliged to convert one system into another by means of one or other of the many excellent tables available. Dr. J. W. Thornton has gone one better and has drawn on a large card logarithmic scales for converting at sight any weight or measure into the other system. These cards have been in use for several years in the pharmacological laboratory of Bristol University and from there have spread to the dispensary of the Royal Infirmary and other places. The seven scales given on this one card cover the every-day needs of the doctor, nurse, dispenser, photographer, or research worker. The card measures 16½ by 21½ inches, is varnished for durability, and corded for hanging on the wall. It is published (price 6*s.*) by John Wright and Sons, Ltd., Bristol, and may be obtained through any bookseller.

ADAPTING THE LIMB TO THE STUMP

ANY surgeon who wishes to know how far the disability of an amputation can be corrected by an artificial leg should read a book by Mr. E. R. Desoutter entitled "Back to Activity" (Desoutter Brothers, Ltd., 73, Baker-street, London, W.1), a copy of which will be sent on application. He will be astonished to find that with an amputation above the knee a man can walk, ski, drive a car, reach a six handicap in golf, and pilot an aeroplane. All this has been achieved with the Desoutter artificial leg. Not only has there been great care in the design of this leg, but every patient receives individual attention which lasts until a satisfactory result is obtained. These limbs are extremely light in weight owing to the use of special alloys and they are matched to the sound limb so that, when the patient has gained skill in walking, it may be quite difficult to detect that he has had an amputation at all. In the book are also hints about the preparation of the stump before fitting the limb.

The makers still complain that amputations are sometimes made too low down in the thigh or leg, and they counsel higher operations in order to make the fitting of an artificial limb easier. Surely this is putting the cart before the horse; a design should be evolved which is adapted to the amputation. The ingenuity and inventiveness which have gone to the making of the Desoutter limb, for which we have nothing but praise, afford us good hope that this will be done.

DENTAL CARIES IN OSLO

Dr. E. H. Schiötz has published in the July number of the *Nordisk Hygienisk Tidsskrift* (page 241) a summary of investigations which he and others have carried out on dental caries. In Oslo only one school-child in five hundred is free from caries, and about every other tooth suffers from it at the school-leaving age. In coöperation with the school medical services of Oslo, the University Hygiene Institute has studied 200 school-children, who in the five-year period 1932–37 were found on routine school inspection to possess intact or at any rate excellent teeth, in the hope of finding the secret of their immunity. It appeared that the chances of a child possessing healthy teeth was 13·5 times as great in the two socially best-situated occupational groups as in the two worst-situated. Other observations concerning dietaries, breast or bottle feeding, the addition of cod-liver oil, malt extract, and other preparations, and the average height and weight of the children were interesting rather than illuminating. In another series of investigations the diets and the state of the teeth of 338 children in 23 "homes" for children were compared. On the whole this class of child appeared to develop healthier teeth than the child who enjoyed the rather fortuitous menus of a workman's home. No correlation could be established between the amount of sugar consumed and the state of the teeth. On the other hand, cod-liver oil came out of the study with credit, for in two institutions in which conditions were similar except in the consumption of sugar and cod-liver oil, the home with the highest consumption of both sugar and cod-liver oil could show the healthiest teeth. Dr. Schiötz is, however, cautious in his interpretation of his findings, and he gives the impression of a judge summing up for a wide-awake and critical jury.

THE CONTOUR TRUSS.—Thos. Beasley has designed and patented a truss which he claims will keep a hernia controlled while allowing free movement. It consists of a webbing belt enclosing a steel strip spring about 18 in. long, bowed outwards from the body. The pad, which is of sponge rubber covered with sheepskin or velvet, is attached at the apex of the bow, so that the spring exerts a firm pressure when the belt is drawn tight. The truss can be worn without an under-strap and the inventor advises that it should be kept on at night. It may be obtained from Messrs. John Bell and Croyden, Wigmore-street, W.1.

TRICHLORETHANOL ON TRIAL: CORRIGENDUM.—The dose of scopolamine mentioned by Dr. Langton Hewer and Dr. Belfrage in our last issue (p. 1291, fifteen lines from the end) was one-hundredth of a grain (gr. 1/100, not gr. 100).

GERMAN CONGRESS ON INTERNAL MEDICINE.—The fifty-first congress of the Deutsche Gesellschaft für Innere Medizin will be held from March 27th to 30th in Wiesbaden under the presidency of Prof. W. Stepp (Munich). The principal subjects for discussion will be arterio-sclerosis; the circulation and the nervous system; focal infection; and dental decay as a symptom of malnutrition.